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STUDIES IN THE BORAGINACEAE, XI

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1. THE SPECIES OF *TOURNEFORTIA* AND *MESSERSCHMIDIA*
IN THE OLD WORLD

THE SPECIES treated here have, in the past, all been referred to the genus *Tournefortia*. I am, however, suggesting that certain of them be segregated to form the redefined genus *Messerschmidia*. During the work on this paper I have been privileged to examine almost all the type-specimens concerned. This has permitted me to place definitely a large number of poorly understood old species that have troubled workers in the past. The work has been undertaken as part of a projected study of the Boraginaceae-Heliotropioideae. It is the first attempt to treat all the Old World species of *Tournefortia* since the presentation by DeCandolle in the ninth volume of the *Prodromus* in 1845.

Tournefortia Linnaeus, Sp. Pl. 140 (1753) and Gen. Pl. ed. 5, 68 (1754).

The species of *Tournefortia* found in the Old World all belong to the following:

Section **EUTOURNEFORTIA** Johnston, Contr. Gray Herb. **92**: 66 (1930). — type-species, *T. hirsutissima* L. *Tournefortia* — *Pittoniae* Humboldt, Bonpland & Kunth, Nov. Gen. et Sp. **3**: 80 (1818). — type-

species, *T. hirsutissima* L. *Tournefortia* sect. *Pittonia* Don, Gen. Syst. 4: 366 (1837). — type-species, *T. hirsutissima* L. *Pittonia* Plumier ex Adanson, Fam. Pl. 2: 177 (1763). — type-species, *T. hirsutissima* L. *Oskampia* Rafinesque, Sylva Tellur. 123 (1838). — type-species, *O. scandens* Raf. & *O. hirsuta* Raf. *Tournefortia* sect. *Tetrandra* DeCandolle, Prodr. 9: 527 (1845). — type-species, *T. tetrandra* Blume. *Tetrandra* (DC.) Miquel, Fl. Nederl. Ind. 2: 928 (1858). — type-species, *Tournefortia tetrandra* Blume.

The species of *Eutournefortia* found in the Old World are remarkable for their parallelism of variation. Most of them have corollas with the tube either long or short, herbage with the pubescence present or absent, as well as leaf-blades that are broad or elongate. The combinations of these variations produce forms very diverse in gross appearance so that it is not at all surprising that botanists have been impressed by them and misled into giving specific names to many of them. A consideration of all the Old World *Eutournefortiae* and observation of the recurrent pattern of variation among them, however, lead one to a proper estimate of the surprisingly diverse phases which they present. Likewise, a consideration of the facts of distribution leads to a similar end. When the variations mentioned are given recognition it is found that the resulting numerous ill defined "species" grow together over most of a common area of dispersal. When the variations mentioned are discounted, species may be defined that have a credible geographic range—a range that is distinct from that of the closely related species and one quite similar and familiar among species of other genera within the region. I am accordingly of the opinion that the variations noted deserve at best no more than mere formal recognition. Since, however, I do not believe that obscure tropical plants should be burdened with numerous subspecific names until some evident use for them arises, I have refrained from any attempt at formally naming the reoccurring combinations of the paralleling intraspecific variations described.

KEY TO THE SPECIES

- Ripened fruit breaking up into four equal single-seeded nutlets,
 these prominently ribbed on their inner surface 1. *T. sarmentosa*.
 Ripened fruit breaking up into two carpels which are each com-
 posed of two seminiferous cells and an intervening empty
 one.
 Flowers 4-merous 2. *T. tetrandra*.
 Flowers 5-merous.
 Continental plants from southern Asia (including the Anda-
 man Islands).

Calyx-lobes 3–4 mm. long at anthesis, usually subulate; leaves drying more or less golden-brown beneath; Sikkim.3. *T. Hookeri*.

Calyx-lobes 1–2 mm. long at anthesis, linear or lanceolate. Flowers with evident pedicels 1–2 mm. long; Madras (cf. no. 5)4. *T. Heyneana*.

Flowers sessile or subsessile.

Leaves abruptly long acuminate, blade more or less oval; flowers and fruit usually shortly pedicellate; Southern Burma and the Andamans.5. *T. ovata*.

Leaves short-acuminate and usually not abruptly so; blades oblong to lanceolate; flowers and fruit sessile6. *T. montana*.

Insular plants.

Western Pacific Ocean.

Leaves opposite, flowers sessile; Philippines.7. *T. luzonica*.

Leaves alternate; flowers short-pedicellate; Australia and Papua8. *T. Muelleri*.

Western Indian Ocean.

Leaves obtuse or rounded at base, 4–11 cm. long.9. *T. puberula*.

Leaves acute at base, 10–20 cm. long.

Stems with minute short closely appressed brownish or golden hairs or quite glabrous; calyx very sparsely strigose, the lobes cuneate, more or less erect; Reunion10. *T. acuminata*.

Stems with evident abundant loosely appressed hairs (usually more or less velvety); calyx usually distinctly hairy with the lobes more or less spreading.

Sepals ovate; Reunion11. *T. arborescens*.

Sepals lanceolate; Mauritius12. *T. Bojeri*.

1. ***Tournefortia sarmentosa*** Lamarck, Tab. Encyc. **1**: 416 (1791); Poiret, Encyc. **5**: 357 (1804). *Tournefortia orientalis* R. Brown, Prod. 497 (1810); Banks & Solander, Bot. Cook's Voy. **2**: 64, tab. 210 (1901). *Tournefortia tetrandra* var. *hirsuta* Blume, Bijdrag. Fl. Nederl. Ind. 845 (1826). *Tournefortia sarmentosa* var. *hirsuta* Blume ex Miquel, Fl. Ind. Batav. **2**: 927 (1858), lapsus. *Tournefortia hirsuta* Reinwardt ex Boerlage, Hand. Fl. Nederl. Ind. **2**²: 487 (1899). *Tournefortia Urvilleana* Chamisso, Linnaea **4**: 465 (1829). *Tournefortia frangulaefolia* Zippel ex Spanoghe, Linnaea **15**: 334 (1841 ?), in synonym. *Tournefortia Horsfieldii* Miquel, Fl. Ind. Batav. **2**: 927 (1858). *Tournefortia acclinis* F. v. Mueller, Frag. **4**: 95 (1864). *Tournefortia macrophylla* K. Schumann & Lauterbach, Fl. Deutsch. Schutzgeb. Südsee 520 (1901). *Tournefortia sarmentosa* var. *magnifolia* Domin, Bibl. Bot. **22**(Heft 89⁴): 1097 (1928). *Tournefortia glabriifolia* Domin, Bibl. Bot. **22**(Heft 89⁴): 1098 (1928).

Java to New Guinea, southward into northern Queensland and northward through the Celebes, Moluccas and Philippines to Formosa.

A variable plant but readily recognized, even in its most diverse forms, by its characteristic fruit. At maturity this breaks up into four equal single-seeded nutlets. All the other Old World *Tournefortiae* have fruits with two 2-seeded carpels. *Tournefortia sarmentosa* has been repeatedly confused with continental species and has been the victim of numerous unsuccessful attempts at segregation. In *T. sarmentosa* the corollas may be either long or short, the herbage either glabrous or pubescent and the leaf-blades either small or large. These characters in various combinations have produced a host of forms that are superficially very diverse in appearance. These forms, however, agree in fundamental fruiting structures. None of them shows any evident geographical correlation. Grouped together to constitute *T. sarmentosa*, as here accepted, they appear as mere phases in a species which has a range that is natural and is of a type quite familiar to any student of the Malaysian flora.

The type of *T. sarmentosa*, in the Lamarck Herbarium at Paris, is labeled "colitur in horto regio insulae Franciaë" and "de M. Sonnerat." It is a good specimen showing leaves and flowers but no fruit. The corolla has a tube ca. 2 mm. long and a limb ca. 2.5 mm. in diameter. The calyx is 1.5 mm. long and has broad hairy lobes. The inflorescence is velvety with a dense short but somewhat shaggy, tan-colored indument. The stems and under surface of the leaves have abundant gray hairs. The upper surface of the leaves are green and only sparsely strigose. The petiole is ca. 1 cm. long. The blade is rounded at the base, acute at the apex, and is 7.5–10 cm. long and 2.8–4 cm. broad. The plant is evidently the small-flowered hairy form of the common *Tournefortia* of the East Indian islands. It is certainly not a native of the Mascarenes! Gagnepain, Not. Syst. 3: 32–33 (1914), has discussed this species. His notes, except those referring to collections by Spire, Thorel, and Watt, all refer to the species as I have taken it. The excluded collections are from the Asiatic continent. The species is restricted to the islands and is not to be expected from the mainland.

The type of *T. orientalis*, at the British Museum, is labeled as collected in 1770 by Banks and Solander at Endeavor Bay in northern Queensland. It is a glabrous plant with ovate to oblong leaves, 7–9 cm. long and 3.5–6.5 cm. broad. The corollas are large with a tube ca. 8–9 mm. long and a limb 3–4 mm. broad.

The type of *T. Urvilleana* was collected by Chamisso in Luzon. It has corollas 8 mm. long and a limb 3 mm. broad. The leaves are slightly less pubescent but otherwise are as in the type of *T. sarmentosa*.

Blume's *T. tetrandra* var. *hirsuta* is given as from the Moluccas and described as follows: "ramis foliis pedunculisque hirsutissimis." At Leiden there is a specimen labeled: "Variet.; Tournefortia hirsuta; Manado; *T. tetrandra* Bl. Variet." The first and the last items are in Blume's script. The specimen is a form with elongate corollas and with more or less hairy leaves suggesting those of *T. Horsfieldii*. Manado is near the northern tip of the Celebes. Another specimen at Leiden has the following label: "1531 Tournefortia hirsuta R.; Habitat in insula Celebes ad viam inter Kema et Manado; Oct. 1821." This is associated with a printed label reading "Herbarium Reinwardtianum; in Acad. Lugduno-Batavia." This second specimen is similar to that first mentioned and both are probably collections made by Reinwardt. They are, I believe, the types of *T. tetrandra* var. *hirsuta* and *T. hirsuta*.

The name *T. frangulaefolia* Zippel has appeared only in synonymy. At Leiden this name appears on two sheets having a printed label bearing: "Herb. Lugd. Batav.; Timor" and one in script reading: "1/6 Tournefortia frangulaefolia; Zp."

Miquel based his *T. Horsfieldii* upon material cited: "Java, in Patjitan, Kelak (Horsf.)." I have examined specimens from Horsfield's personal herbarium at the British Museum and those from the set he made for the East India Company (now kept as a unit) at Kew. He made two collections referable to *T. sarmentosa*, **1**: Pajittan (Kalak) Horsfield (borage 6) no. 275; and **2**: Blambangan, Horsfield (borage 7) no. 309. The former is evidently the type collection of *T. Horsfieldii*. It is a plant with very large leaves that are grayish velvety beneath. The blade becomes 10–14 cm. long and 7–9 cm. broad. The corolla-tube is 7–8 mm. long and the limb is 3–4 mm. broad.

Tournefortia acclinis is based upon material from Queensland collected by Bowman at Broad Sound and Amity Creek, and by Dallachy at Edgecombe Bay. A study of the original description and of a duplicate of Dallachy's material at Kew shows this species to have moderately sized leaves (5–10 cm. long and 3.5–6 cm. broad), a coarse appressed pubescence, a corolla with a tube 3–5 mm. long, and a corolla-limb 3–4 mm. broad. It is very similar to *T. Horsfieldii*, except in leaf-size.

The type of *T. macrophylla* was collected by Lauterbach (no. 2003) at Erima in eastern New Guinea. It is in fruit. The leaves are similar in size and shape to those of typical *T. Horsfieldii*. In fact the plant differs from the type of that species only in the practical absence of pubescence. The leaves have only a few weak scattered inconspicuous hairs along the nerves.

Domin's *T. sarmentosa* var. *magnifolia* from northern Queensland

(*Dietrich 724*), to judge from description, seems to be merely a form of *T. sarmentosa* with very large (12–15 cm. long, 6–6.5 cm. broad) hairy leaves, and small corollas (corollae tubo breviores). His *T. glabrifolia* is another large-leaved (10–13 cm. long and 5–5.5 cm. broad) plant. The leaves are glabrous. The corolla-tube is ca. 3–4 mm. long and the limb is ca. 2 mm. broad. The plant comes from Harvey's Creek in northeastern Queensland. It appears to differ from the type of *T. orientalis* only in its larger leaves and smaller corollas.

2. ***Tournefortia tetrandra*** Blume, *Bijdrag. Fl. Nederl. Ind.* 845 (1826). *Tournefortia tetragona* Blume ex Steudal, *Nomencl. ed.* 2, 2: 694 (1841). (?) *Heliotropium scandens* Norona, *Verh. Bat. Genootsch* 5: 78 (1827); Hasskarl, *Cat. Hort. Bogor.* 137 (1844), nomen. *Tournefortia tetrandra* var. *glabra* Hasskarl, *Flora* 25²: Beibl., p. 27 (1842); Hasskarl, *Cat. Hort. Bogor.* 137 (1844); Hasskarl, *Pl. Javan. Rariores* 492 (1848). *Tournefortia glabra* (Hassk.) Zollinger & Moritzi ex Zollinger, *Natuur- en Geneeskundig Archief v. Nederl. Ind.* 2: 5 (1845). *Tetrandra glabra* (Hassk.) Miquel, *Fl. Nederl. Ind.* 2: 929 (1858). *Tournefortia tetrandra* var. *longiflora* Hasskarl, *Cat. Hort. Bogor.* 137 (1844), nomen; Hasskarl, *Pl. Javan. Rariores* 492 (1848). *Tournefortia Wallichii* DeCandolle, *Prodr.* 9: 527 (1845); Ridley, *Fl. Malay Penin.* 2: 441, fig. 115 (1923). *Tetrandra Wallichii* (DC.) Miquel, *Fl. Nederl. Ind.* 2: 928 (1858). *Tetrandra Zollingeri* Miquel, *Fl. Nederl. Ind.* 2: 928 (1858).

Nicobar Islands, Malay Peninsula, Sumatra, Java, Borneo and Celebes.

This is apparently the most common and best known of the Javan species of *Eutournefortia*. The Javan plant has received the following basic names, *Tournefortia tetrandra* Blume, *Tournefortia tetrandra* var. *glabra* Hassk., *Tournefortia tetrandra* var. *longiflora* Hassk., and *Tetrandra Zollingeri* Miquel. The differences between these named forms are minor and variable ones of corolla-size and of distribution of pubescence on the foliage. This variable plant of Java I am quite unable to distinguish from *Tournefortia Wallichii* DC., a species based upon material from Singapore and Penang. I have accordingly accepted *Tournefortia tetrandra* as ranging from the Nicobar Islands eastward to Java and the Celebes. The leaves of this species are ovate-acuminate or lance-ovate and are glabrous or sparsely strigose. The fruit is usually subglobose and 4–6 mm. in diameter. The only notable departure from this is found among material from northern Borneo where the fruit, of several different collections, is narrowly ovoid, 7 mm. long and 4–5 mm.

thick. This form may deserve some nomenclatorial recognition. There are, however, variations of *Tournefortia tetrandra* which I believe do merit recognition at this time. The characters which set these off from typical *T. tetrandra* may be organized as follows:

Leaves $1\frac{1}{2}$ – $2\frac{1}{2}$ times as long as broad, ovate acuminate or lance-ovate *Tournefortia tetrandra*
 Leaves $2\frac{1}{2}$ – $3\frac{1}{2}$ times as long as broad, more or less lanceolate.
 Leaves dull, east Java var. *angustifolia*.
 Leaves somewhat glossy, Ceylon var. *Walkerae*.

2A. ***Tournefortia tetrandra*** Blume var. ***angustifolia*** Moritzi, Syst. Verzeich. 52 (1845–46).

Known only from the type-collection in eastern Java.

This variety is a peculiar plant with very dull thickish leaves that have only 3–4 pairs of primary veins evident. The secondary nervation is not discernible. I know it only from the type-collection by Zollinger (no. 939), made Dec. 17, 1842, "auf den Kalkfelsen von Kuripan."

2B. ***Tournefortia tetrandra*** Blume var. ***Walkerae*** (Clarke), comb. nov. *Tournefortia Walkerae* Clarke in Hooker, Fl. Brit. India 4: 147 (1883); Trimen, Fl. Ceylon 3: 198 (1895).

Known only from Ceylon.

This plant is simply a narrow-leaved form of the species that is confined to Ceylon. The blades are lanceolate but are quite similar to those of the species in texture, nervation, etc. The fruit and flowers are similar to the common Malaysian plant.

3. ***Tournefortia Hookeri*** Clarke in Hooker, Fl. Brit. India 4: 147 (1883). *Tournefortia Hookeri* var. *subtropica* Clarke in Hooker, Fl. Brit. India 4: 147 (1883).

Known only from the base and lower valleys of the Sikkim Himalayas.

SPECIMENS EXAMINED: Rangit, May 15, 1876, *Clarke 27953* (K); Great Rangit, April 1850, *Hooker & Thompson* (K, TYPE of var. *subtropica*); Mangpu, 900 m. alt., May 1905, *Meebold 4243* (BD); Rangbi, 1500 m., May 31, 1870, *Clarke 11790* (K, BM); Chunbati, 600 m., June 12, 1870, *Clarke 12024* (K, BM); Chunbati, 600 m., April 1876, *Gamble 579* (K); below Punkabaree, *Hooker* (BD); Pancheni, 1875, *Gamble 3370* (K); Siliguri, Jan. 1873, *Gamble 3369* (K); Dalgaon, mixed forest, April 9, 1893, *Haines 358* (K); Sikkim, 1862, *Andersson 270* (BD); Sikkim, March 1871, *Clarke 16774* (K); Sikkim Terai, *Clarke* (K); Sikkim, *Griffith 5928* (K).

Characterized by its slender well developed calyx-lobes and by the golden or golden-brown under surfaces of the leaves. These latter are nearly glabrous or have only scattered hairs along the dark-colored

nerves and veins. The corolla is usually 3–5 mm. long with the tube forming half (or even more) of this total length. In the var. *subtropica*, which is merely the large-flowered form of the species, the corollas become ca. 8 mm. long and the calyx-lobes only about a third as long as the tube. The species is a local one and probably worthy of recognition. It is most closely related to the form of *T. montana* described as *T. khasiana*.

4. **Tournefortia Heyneana** Wallich, Num. List no. 910¹ (1828–29), nomen; Don, Gen. Syst. 4: 369 (1837); Clarke in Hooker, Fl. Brit. India 4: 145 (1883); Gamble, Fl. Madras 893 (1923). *Tournefortia reticosa* Wight, Icones 4²: 16, tab. 1386 (1848); Wight, Spicileg. Neilgherrense 2: 83, tab. 189 (1851); Gamble, Fl. Madras 893 (1923).

Hills of southern peninsular India, about lat. 11°–13° N. and long. 76°–77° E.

SPECIMENS EXAMINED: Nilgiri Hills, April 1852, *herb. Wight 2057* (K); Devala, Nilgiris, 900 m. alt., Nov. 1884, *Gamble 15588* (K); S. E. Wynaad, Nilgiris, 900 m. alt., Nov. 1884, *Gamble 15497* (K); Wynaad, *Beddome 5437* (BM); Nadooputtah, June 1846, *herb. Wight* (K); Anamalais, *Beddome 5438* (BM); Carcoor-ghat, Nilgiris, Aug. 1887, flowers varying from 1/8–1/2 inch according to age, *Lawson* (Oxford); Coorg, *White* (Oxford); Peermade Reav (? spelling), 1350 m. alt., Dec. 1910, *Meebold 12920* (BD); without data, *herb. Wight*, probable basis of Wight's plate and the TYPE of *T. reticosa* (K); without data, *ex herb Heyne, Wallich 910¹* (*herb. Wallich* at Kew).

A study of Wallich's herbarium, now at Kew, shows his number 910 to consist of two different species from opposite ends of India. The label reads: "910 Tournef. Heyneana, Wall. — 1. Herb. Heyn. — 2. Pundua F. de S." The Heyne plant represents the species from the Deccan with pedicellate flowers, which is the one treated here. The plant from Pundua, collected by de Sylva, is accompanied by a large special label indicating that it was found in the "Pundouh Hills" in Jan. 1824.

Clarke describes the flowers of *T. Heyneana* as 1/8–1/6 inches (3–4 mm.) long. These measurements are evidently from the duplicate of the Wallich collections now in the general herbarium at Kew. The Heyne material in the Wallich Herbarium at Kew has corollas 9–10 mm. long. The specimens, except for flower-size, are otherwise very similar and I believe they represent minor forms of the species. Significant in this connection is the note made by Lawson on one of his specimens cited above. He states that the corolla varies from 3–12 mm. according to age! Though Don makes no mention of the corolla-size in his description, the first given to the species, we may suppose that it was the large-flowered phase since the Wallich Herbarium, then in charge of the

Linnean Society, was no doubt consulted by him. In any case, since the corolla-size is variable even within the type-collection, the chief character whereby Clarke distinguished *T. reticosa* now disappears. The two species, *T. Heyneana* and *T. reticosa*, are, I believe, trivial forms of one species and quite synonymous.

DeCandolle, Prodr. 9: 516 (1845), received only the second part of Wallich no. 910, and described this as *T. Heyneana*. His description in the Prodr. consequently, is based upon de Sylva's specimens from Pundua. Clarke pointed out this mistake, gave a new name (*T. Candollii*) to the de Sylva collection described by DeCandolle, and properly restricted the name, *T. Heyneana*, to the peninsular species collected by Heyne.

5. ***Tournefortia ovata*** Wallich, Num. List no. 908 (1828); Don, Gen. Syst. 4: 369 (1837); DeCandolle, Prodr. 9: 516 (1845); Clarke in Hooker, Fl. Brit. India 4: 147 (1883).

Southern Burma and the Andaman Islands.

SPECIMENS EXAMINED: Rangoon, Aug. 1826, *Wallich (no. 15) 908* (herb. Wallich, TYPE); Rangoon, *McClelland* (K, three collections); Andamans, April 1891, *Prain* (Cambridge); Middle Andaman, Homfray Straits, climber, 1915, *Parkinson 297* (K); Aberden, South Andaman, *Kurz* (K, parasitized; Delessert, normal); Chauldare, South Andaman,

Characterized by its elliptical abruptly acuminate leaves, its subpedicellate flowers and its southern occurrence. The corolla becomes 8 mm. long. The calyx is only 1.5 mm. long at anthesis. The leaves are mostly rather firm in texture and are usually brown and glabrous beneath. One of McClelland's collections is consequently quite atypical in having the leaves not only thin in texture but golden-brown beneath as well. Another one of his collections is quite hairy on the lower leaf-surface. The pedicels in *T. ovata* are usually at most only 1 mm. long, though in Parkinson's material cited the pedicels become fully 2 mm. long and are quite evident.

6. ***Tournefortia montana*** Loureiro, Fl. Cochinch. 1: 122 (1790). *Messerschmidia montana* (Lour.) Roemer & Schultes, Syst. 4: 544 (1819). *Lithospermum viridiflorum* Roxburgh, Hort. Bengal. 13 (1814), nomen; Lehmann, Asperif. 1: 30 (1818), in synonym.; Roxburgh, Fl. Indica 2: 4 (1824), description; Roxburgh, Icones ined. Kew. tab. 2120. *Heliotropium viridiflorum* (Roxb.) Lehmann, Asperif. 1: 30 (1818). *Tournefortia viridiflora* (Roxb.) Wallich, Num. List no. 907 (1828); Clarke in Hooker, Fl. Brit. India 4: 146 (1883). *Tournefortia Sampsoni* Hance, Jour. Bot. 6: 330 (1868). *Tournefortia Wightii* Clarke in Hooker, Fl. Brit. India 4: 146 (1883). *Tournefortia Rox-*

burghii Clarke in Hooker, Fl. Brit. India 4: 146 (1883). *Tournefortia viridiflora* var. *Griffithii* Clarke in Hooker, Fl. Brit. India 4: 146 (1883). *Tournefortia Candollii* Clarke in Hooker, Fl. Brit. India 4: 146 (1883). *Tournefortia khasiana* Clarke in Hooker, Fl. Brit. India 4: 147 (1883). *Tournefortia Boniana* Gagnepain, Not. Syst. 3: 33 (1914) and in Lecomte, Fl. Gén Indo-Chine 4: 217 (1914). *Tournefortia Gaudichaudii* Gagnepain, Not. Syst. 3: 34 (1914) and in Lecomte, Fl. Gén. Indo-Chine, 4: 217 (1914). *Tournefortia Heyneana* sensu DeCandolle, Prodr. 9: 516 (1845).

In the hills, up to 1500 m. alt., in Assam, Upper Burma, northern Siam (Payap and Maharat), middle and northern Indo-China (Anam, Laos and Tonkin) and southern-most China (Yunnan, Kwangsi and Kwangtung).

This species presents a number of diverse phases resulting from combinations of variations in leaf-size, abundance and distribution of pubescence, and size of corolla-tube. These phases have been treated as "species" but their variability, their erratic distribution, and their occurrence together in various localities lead me to believe they are merely further manifestations of the surprising intraspecific variability of these structures among the Old World *Tournefortiae*. After discounting these variations as mere phases, I am struck with the naturalness of the distribution of the resulting aggregate species. The distribution is of the pattern found in numerous species of other genera and families inhabiting this part of Asia.

The type of *T. montana* has not been examined. Its source is not given, but the probabilities are that it came from Anam. Dr. E. D. Merrill, who has devoted much time to the consideration of Loureiro's writings, informs me that he knows no reason for doubting Loureiro's generic attribution in the present case. After a study of the description I am perfectly content to accept Loureiro's name for this species. The leaves are given as ovate-lanceolate and glabrous. Unfortunately, however, no information is given as to the shape or size of the corolla-tube.

The second name applied to our species is *Lithospermum viridiflorum*. It first appears in 1814 as a name in a list of the Calcutta Garden and is given as collected by Roxburgh at Chittagong. It was no doubt this same garden material that was described in 1824 by Wallich in Roxburgh's Flora and is now represented in Wallich's herbarium (no. 907). It is also the plant represented in Roxburgh's unpublished plates (no. 2120) now preserved at Kew. The first description of the plant, as *Heliotropium viridiflorum*, is that by Lehmann in 1818. His material also seems to have come from the Calcutta Garden. Hence, there is

every reason for taking the material grown at Calcutta as typical. This is a form characterized by distinctly lanceolate leaves that are velvety all over beneath and by small strigose corollas. The corolla-tube is 2–3 mm. long, usually densely strigose and commonly only twice the length of the calyx or less. This form has not been collected about Chittagong. As Clarke has indicated, l. c. 146, the common form of *T. montana* about Chittagong, particularly in the region in which Roxburgh is known to have collected, is the plant with long corolla-tubes described by Clarke as *T. Roxburghii*. As matters stand, therefore, we may either believe that Roxburgh did not collect his plant at Chittagong, or that having collected the common long-tubed *Tournefortia* there it subsequently became a short-tubed form under garden conditions. I have seen material of the type-form of *T. viridiflora* from Assam, Burma and Siam.

The type of *T. viridiflora* var. *Griffithii* is a collection made in the Khasia Hills by Griffith. It differs from the type-form of *T. viridiflora* in having the leaves much less hairy or nearly glabrous beneath and corollas that are possibly a trifle larger. The type of *T. Boniana* collected by Bon (no. 1932) at O-cach, on the mountain Ma-dong in Indo-China, is quite similar. I have seen this glabrescent small-flowered form from Assam, Burma and Indo-China.

In publishing *T. Wightii*, Clarke gave its source as "Deccan Peninsula, Wight." The type is Wight no. 2056 and is accompanied with one of the old printed labels indicating that it was part of the Wight materials handled at Kew in 1866–67. The label proper is headed "Peninsula Indiae Orientalis." We may accept that no. 2056 was part of the Wight Herbarium but as to the collector of the specimen and its original source doubt must remain. Since the plant agrees closely with plants from Burma I suspect that perhaps it came from that general region and may represent material received by Wight from Roxburgh or some other collector of that period. Gamble, Fl. Madras, 894 (1923), reports the species from the Anamalai Hills, Madras. The only *Tournefortia* I have seen from that general region is *T. Heyneana*! Until undoubted material from Southern India is forthcoming I believe that *T. Wightii* should be accepted as clearly applying to the material east of the Ganges here discussed. In the type-form of *T. Wightii* the leaf-surface is velvety beneath much as in typical *T. viridiflora*. The corolla is much larger, however, with the tube 2–4 times as long as the calyx. *Tournefortia Roxburghii* is a form of *T. Wightii* which has lanceolate rather than ovate leaf-blades. It is a rather common form. I have seen plants similar to the type-form of *T. Wightii* and *T. Roxburghii* from throughout the range of *T. montana*.

Tournefortia Candollii is based upon "*T. Heyneana*, DC. Prodr. ix. 516; Wall. Cat. 910, as to the Khasia examples." In the Wallich Catalogue no. 910 consists of two parts, 1. material from Heyne, the type of *T. Heyneana* Wall. and 2. material collected by de Silva at Pundua. DeCandolle's specimen of *Wallich 910* consists only of the second part of the Wallich number, that is to say, the material from Pundua by de Silva. This specimen was described by DeCandolle as *T. Heyneana*. Clarke, l. c. 145, recognizing that the name *T. Heyneana* was obviously to be associated with Heyne's material from southern India, gave a new name, *T. Candollii*, to the plant improperly described as *T. Heyneana* by DeCandolle. The type of *T. Candollii* is accordingly de Silva's material in the DeCandollean Herbarium. The specimen at Geneva is broken and poor but has good corollas. These are somewhat constricted at the throat and very similar to those found in the type of *T. khasiana*. The leaves are lanceolate, dried brown beneath and nearly black above. They are very sparsely strigose above and have only scattered hairs along the principal veins beneath.

I consider *T. Candollii* to be the form of *T. montana* with elongate corolla-tubes and glabrescent leaves. Belonging with it are several further synonymous forms. The type of *T. Sampsoni* is from Sai-chü-shan caverns in the province of Kwangtung and is now deposited at the British Museum. There is some interesting variation within this collection. The corolla-tube is medium to long (5–8 mm.) and the lanceolate leaves are either distinctly appressed hairy or are quite glabrous beneath. The type of *T. khasiana* was collected by Clarke (no. 15227) at Nonpriang in the Khasia Hills. It is a form of *T. Candollii* in which the corolla-tube is contracted upward toward the throat so that the throat is at times almost half the diameter of the base of the tube. The type of *T. Gaudichaudii* is a glabrescent plant with elongate corollas and broadly lanceolate leaves. It was collected in Anam (Tourane) by Gaudichaud.

7. ***Tournefortia luzonica*** sp. nov., scandens grisea; ramulis obscure tetragonis 2–4 mm. crassis pilis numerosis brevibus divergentibus vestitis; foliis oppositis vel suboppositis; petiolis 5–14 mm. longis; lamina folii ovata vel late lanceolata 5–13 cm. longa 2–7 cm. lata apice breviter acuminata basi rotunda vel (1–4 mm. profunde) cordata, supra pilis rigidulis brevibus ascendentibus plus minusve numerosis vestita, subtus pallidiore pilis gracilibus falcatis saepe numerosis vestita nervis 6–9-jugatis ornata; inflorescentia hispidula; calycibus sessilibus 1–2.5 mm. altis, lobis anguste lanceolatis vel linearibus erectis; corolla virescentibus, tubo 2–4(–8) mm. longo, limbo 2–2.5 mm. lato; fructu globoso

3–4 mm. diametro albo glaberrimo succoso; nuculis 2 biovulatis laevibus.

Endemic to the Philippines where it is confined to the mountainous regions of northern, east-central and southern Luzon.

SPECIMENS EXAMINED: vicinity of Peñablanca, Cagayan Prov., a vine on hillside, fl. green, fruit white, May 3, 1917, *M. Adduru 237* (TYPE, herb. Arnold Arboretum; isotype, Kew); Peñablanca, 1926, *Ramos & Edaño 46663* (BM); Bangui, Prov. Ilocos Norte, *Ramos 27563* (BM); Burgos, Prov. Ilocos Norte, *Ramos 4799* (BD); Bocana del Abra, Prov. Ilocos Sur, *Micholitz* (K); Mt. Pulog, Mountain Prov., Jan. 1909, *Curran, Merrill & Zschokke 16103* (BD); Benguet, *Loher 1541, 1542* (K); dist. of Lepanto, Mountain Prov., *Vidal 3326* (K); Baguio, Benguet, *Elmer 8467* (AA, K); Mt. Maquilong, Prov. Batangas, *Vidal 3327* (K); Prov. Albay, *Cuming 1215* (K, BM, BD).

7A. ***Tournefortia luzonica*** var. ***sublucens***, var. nov., a forma typica speciei differt foliis sparse inconspicueque pubescentibus, supra vix griseis sed sublucentibus.

Confined to the mountains of west-central Luzon.

SPECIMENS EXAMINED: Anuling, Zambales Prov., 1924, *Ramos & Edaño 44553* (TYPE, herb. Arnold Arboretum; isotypes, Kew, Brit. Mus.); Zambales, 1907, *Ramos 4799* (BD); Lamac, Mt. Mariveles, Bataan Prov., *Meyer 2844* (K, BD); Lamac River, Mt. Mariveles, 350 ft. alt., slender vine growing over trees for many yards, *Williams 525* (K).

Among all the Old World species of *Tournefortia* this species is unique in the possession of opposite or subopposite leaves. In the treatments of the Philippine *Boraginaceae* by Robinson, Philip. Journ. Sci., Bot. 4: 694 (1909), and by Merrill, Enum. Philip. Pl. 3: 376 (1923), this plant has generally passed as *T. Horsfieldii* Miquel. That species, however, with its alternate leaves and a fruit composed of four uniovulate nutlets is one of the forms of the widely ranging *T. sarmentosa*.

The var. *sublucens* is confined to the mountainous country of west central Luzon, prov. Bataan and Zambales, and seems to have a range quite distinct from the typical form of *T. luzonica* which ranges in the other parts of the island of Luzon. Essentially a glabrate form of *T. luzonica*, with the upper leaf-surfaces more or less glossy, it is significant and worthy of nomenclatorial recognition only if it has a range apart, and is geographically correlated.

8. ***Tournefortia Muelleri***, nom. nov. *Tournefortia mollis* F. v. Mueller, Frag. 1: 59 (1858); Bentham, Fl. Austral. 4: 390 (1869); Bailey, Queensland Fl. 4: 1041 (1901); not *T. mollis* Bertol. (1852).

Northern Australia and Papua.

SPECIMENS EXAMINED: Edgecombe Bay, Queensland, *Dallachy* (K); along Burdekin River, *Mueller* (K, isotype); Herbert River, *Dallachy*

(K); Cape York Peninsula Exped., *Hann 146* (K); shores of Montague Sound, W. Australia, 1820, *Cunningham 182* (K, BM) and *324* (BM); erect shrub 1.5–2 m. tall, fringing tidal areas, Kapa Kapa, Papua, *Brass 505* (AA, K); Port Moresby, Papua, 1918, *White 6* (AA).

The carpels seem to be more bony than in other Old World species of this section. The leaves are usually lanate.

9. ***Tournefortia puberula*** Baker, Jour. Linn. Soc. London, **20**: 211 (1883). *Tournefortia Mocquerysi* A. DeCandolle, Bull. Herb. Boiss. ser. 2, **1**: 581 (1901).

Forests of eastern Madagascar and the Seychelles. Possibly introduced in the latter archipelago.

SPECIMENS EXAMINED: MADAGASCAR: forests east of Ivohibé, 1000 m. alt., fl. white, Nov. 3, 1924, *Humbert 3163* (P); high valley of the Rienana, drainage of the Matitana, 1000–4000 m. alt., fl. white, Nov. 1924, *Humbert 2523* (P); Central Madagascar, *Baron 1957* (Kew, TYPE of *T. puberula*; BM, BD, isotypes), *2798* (K, BM, P), *3106* (K, P) and *6991* (K); forest of Ivohimanitra, Nov. 8, 1894, *Forsyth Major 64* (K, BM, BD, P); forest of Analamazaotra near col d'Amboasary, ca. 950 m. alt., shrub with white flowers, Oct. 23, 1912, *Viguierro & Humbert 978* (P); forest at head of Antongil Bay, a liana with white flowers, *Mocquerys 161* (Deles., TYPE of *T. Mocquerysi*). SEYCHELLES: Mahé, common shrubby climber in hills near streams, Sept. 1871, *Horne 247* (K); Mahé, *Thomasset* (K); Mahé, *Thomasset 10* (BM); Mahé, 1867, *Wright* (BM); Terné, Mahé, 1908, *Gardiner* (K); Silhoutte, common in cultivation, 1908, *Gardiner 113* (K); indefinite, a twining shrub generally on rocks near rivers, May 1902, *Thomasset 22* (K, BM).

The types of *T. puberula* and *T. Mocquerysi* are quite indistinguishable. The species is a readily recognizable one. The leaves are firm, apparently glabrous and the stems are covered with a minute brownish puberulence. There is both a short- and a long-corolla form. The plant of the Seychelles is certainly identical with that of Madagascar. Possibly it represents a horticultural introduction to the islands. In accounts of the Seychelles flora, Baker, Fl. Mauritius and Seychelles 202 (1877), and Summerhayes, Trans. Linn. Soc. London, Zoölogy, **19**: 284 (1931), the species has consistently been misdetermined as *T. sarmentosa*.

9A. ***Tournefortia puberula*** var. ***Kirkii***, var. nov., a varietate genuina differt pilis brevibus pallidis adpressis ornatis.

Islands off the northwest coast of Madagascar.

SPECIMENS EXAMINED: Mohilla Island, Comoro Archipelago, April 1861, *J. Kirk* as "*Tournefortia* (3)" (TYPE, herb. Kew); Nossi-bé, June 1847, *Boivin 2086* (P); Nossi-bé, 1853, *Perrille* (P).

This variety comes from a much more arid region than typical *T.*

puberula and may be only a hairy xerophytic form of that species. In typical *T. puberula* the plant is provided with a minute, frequently somewhat golden puberulence. In the var. *Kirkii* the stems have a sparse pale short strigosity that tends to disappear with age. The petioles are sparsely strigose. The lower surface of the leaf-blades has short white closely appressed hairs scattered along the rib and veins. The upper surface is somewhat strigose but less abundantly so than below. The inflorescence has numerous short ascending pale hairs.

10. ***Tournefortia acuminata*** DeCandolle, Prodr. 9: 520 (1845); Cordemoy, Fl. Réunion 479 (1895).

Endemic to the Island of Reunion (Bourbon).

SPECIMENS EXAMINED: les hauts du Boucan Launay, *Boivin 1241* (K, BD, DC, Boiss, P); Bébour au dessus de la plantation de Quinquinas, July 28, 1875, *G. de l'Isle 499 bis* (K, Coss.); Bourbon, arbor, [*?Commerson*] (herb. Smith); chemin que conduit de Sante Rose à Saint Joseph avaut la descente qui conduit au Volcan, 1812, *Commerson* (P); "l'Ile de France au bourbon," *ex Mus. Paris* (TYPE, herb. DC).

The type of *T. acuminata* at Geneva is given as distributed from Paris in 1821 and as from either Reunion or Mauritius. It represents a form in which the stems, petioles and inflorescence are glabrous or only very scantily strigose. It is obviously a duplicate of the collection at Paris which is labeled as collected by Commerson on the road between Ste. Rose and St. Joseph on Reunion. The material which I have cited from Boivin, which is widely distributed in European herbaria, is a form in which the stems, petioles and inflorescence have a short and evident, though not very abundant nor very conspicuous strigosity that becomes more or less brownish or golden. This I believe is the common form of the species. The leaves in *T. acuminata* are 12–17 cm. long and 3.5–7 cm. broad, are acute at both ends, and have 10–15 pairs of nerves. The calyx is 1.5–2 mm. long at anthesis and has erect, cuneate or more or less lanceolate lobes. The corolla-tube is 3.5–7 mm. long. The limb is ca. 4 mm. broad.

11. ***Tournefortia arborescens*** Lamarck, Tab. Encyc. 1: 417 (1791); Poiret, Encyc. 5: 357 (1804). *Tournefortia velutina* Smith in Rees, Cyclop. 36: sp. no. 13 (Aug. 1817!), not *T. velutina* HBK. (1818). *Tournefortia Bojeri* sensu Cordemoy, Fl. Réunion 479 (1895).

Endemic to the Island of Reunion (Bourbon).

SPECIMENS EXAMINED: Grand Bassin, Aug. 6, 1875, *G. de l'Isle 454* (K, P); Gauteuron (spelling ?) du Gol, woods, fl. white, *Commerson* (herb. Smith, TYPE of *T. velutina*); Reunion, *Commerson* (herb. Smith,

second sheet of *T. velutina*), *Bory* (Deles) *Boivin* (BD) and *Guyot 431* (BD); "in Mauritius," *herb Bojer* as *T. bifida* (BM); "de l'inde" [*? Sonnerat*] (Paris, TYPE of *T. arborescens*).

The type material of *T. arborescens* is accompanied by a small label reading: "Tournefortia d l'inde." The collector is not indicated but both Lamarck and Poiret attribute it to Sonnerat who visited the Mascarenes during his voyage to India and Malaysia. The material consists of two sheets, one bearing a sterile shoot with entire oblanceolate leaves more or less tomentose beneath in the manner common in the spicate *Cordia* species of the section *Varronia*. The second sheet contains a *Tournefortia* in flower. The latter is a form of the species as here defined, having the leaves only very sparsely and obscurely strigose, particularly above. The stems bear numerous but not very abundant short appressed pale hairs. The calyx-lobes are ovate, acute and sparsely pale strigose. The specimen evidently represents the sparsely hairy form of the endemic species of Reunion.

The type of *T. velutina* is the form of the species with very abundant long hairs. It has the leaves pale and silky with a dense indument of slender very pale hairs. The calyx lobes are ovate, densely hairy and more or less golden tawny. Smith mentioned atypical material of his *T. velutina* from Mauritius, but this, in fact, represents a form of *T. Bojeri*. DeCandolle, *Prodr.* 9: 514 (1845), incorrectly cited *T. velutina* as a possible synonym of *T. argentea*. I have cited above a specimen given as collected on Mauritius by Bojer. I doubt the accuracy of the geographical data and believe that the specimen is really from Reunion. Its broad calyx-lobes are ovate or orbicular-ovate and hence similar to those found in all material indubitably from that island.

12. **Tournefortia Bojeri** A. DeCandolle, *Prodr.* 9: 516 (1845); Baker, *Fl. Mauritius*, 202 (1877). *Tournefortia bifida* sensu Bojer, *Hort. Maurit.* 234 (1837).

Endemic to the Island of Mauritius (Ile de France).

SPECIMENS EXAMINED: Mauritius, woods, 1837, *Bojer* as *T. bifida* (TYPE, herb. DC); without locality, 1839, *Bouton* as *T. bifida* (DC, co-type); Mauritius, mountains and forest, *Bouton* (K); Mauritius 1854, *Boivin* (K); Mauritius, 1811, *Hardwick* (BM); Mauritius, [*Commer-son*] (herb. Smith); Mauritius, *Sieber 98* (BD); Mauritius, *herb. Labillardière* (Deles); "Bourbon," 1853, *Boivin* (Boiss):

Boivin's collection which it cited above and attributed to Reunion is, I believe, mislabeled. Indubitable collections of *T. Bojeri* come only from Mauritius. The species is very closely related to *T. arborescens* of Reunion, differing chiefly in the narrower calyx-lobes. In the DeCandolle Herbarium there is a branch of *T. Bojeri*, mounted on a sheet with

isotypic material of the Philippine *T. Urvilleana*. The only label accompanying this mixed sheet is in the script of Chamisso and belongs to the Philippine species. This mixed sheet makes comprehensible DeCandolle's, Prodr. 9: 515, adnot. (1845), strange comparison of *T. Bojeri* and *T. Urvilleana*. Since Chamisso never visited the Mascarenes it is evident that the spray of *T. Bojeri* has somehow become divorced from its proper label. The name "*T. cymosa* Heyne" seems to be based upon material from Mauritius. For a discussion of this *nomen* see my list of doubtful and excluded species on p. 166.

In *T. Bojeri* the stems, petioles and inflorescence are more or less velvety with a pale ascending or spreading (or very rarely appressed) usually abundant hairs. The leaf blade is acute at both ends, more or less strigose on both surfaces though usually less so above. It has 10–12 pairs of veins and is 11–17(–24) cm. long and 2–5(–6) cm. broad. The calyx is 2–2.5 mm. long and has the lobes cut at least $\frac{3}{4}$ way to base. It is more or less silky strigose. The lobes are lanceolate to broadly lanceolate or cuneate-lanceolate. The corolla-tube is 2–8 mm. long, and 2–5 times the length of the calyx. The corolla-limb is 2–3 mm. broad. The fruit is ca. 3 mm. in diameter.

Messerschmidia Linnaeus ex Hebenstreit, Nov. Comment. Acad. Sci. Imp. Petrop. 8: 315, tab. 11 (1763); Gmelin, Fl. Sibir. 4: 77 (1769); Murray, Syst. Nat. ed. 13, 161 (1774); Linnaeus fil. Suppl. Pl. 132 (1781). — type-species, *Tournefortia sibirica* Linn. *Messerschmidia* Linnaeus, Hort. Upsal. 36 (1748); Linnaeus, Mant. 1: 5 and 42 (1767); Linnaeus, Syst. ed. 12, 149 (1767); Linnaeus, Mant. 2: 334 (1771). — a variant spelling of *Messerschmidia*, type-species, *Tournefortia sibirica* Linn. *Tournefortia* sect. *Messerschmidia* (Linn.) DeCandolle, Prodr. 9: 528 (1845); as to nomenclatorial type only, not as to the species of *Heliotropium* treated. *Argusia* Amman, Stirp. Rar. Ruth. 29 (1739). *Arguzia* [Amman] Rafinesque, Sylva Tellur. 167 (1838); Steven, Bull. Soc. Nat. Moscow 24¹: 558 (1851). — type-species, *Tournefortia sibirica* Linn. *Tournefortia* sect. *Arguzia* [Amman] DeCandolle, Prodr. 9: 514 (1845); Ledebour, Fl. Ross. 3: 97 (1847–49). — type-species, *Tournefortia sibirica* Linn. *Tournefortia* sect. *Mallota* A. DeCandolle, Prodr. 9: 514 (1845). — type-species, *T. argentea* Linn. *Tournefortia* sect. *Mallotonia* Grisebach, Fl. W. Ind. 483 (1861). — type-species, *Tournefortia gnaphalodes* R. Br. ex R. & S. *Mallotonia* (Griseb.) Britton, Ann. Mo. Bot. Gard. 2: 47 (1915). — type-species, *Tournefortia gnaphalodes* R. Br.

Segregated here, as the emended genus *Messerschmidia*, are three

remarkable species that depart widely in appearance from the numerous and habitually very uniform species formerly associated with them in *Tournefortia*. As I have redefined and amplified *Messerschmidia* it consists of the original Asiatic herb, *Tournefortia sibirica*, the strand-shrub of the Antilles, *T. gnaphalodes*, and the well known strand-tree of the Indian and Pacific oceans, *T. argentea*. All these species differ widely not only in their habit of growth and in their selection of habitat from all the other species that have been traditionally placed with them in *Tournefortia*, but also in their pronounced development of a corky exocarp which sets them off not only from all species of *Tournefortia* but from all other *Boraginaceae* as well. All three of the species show a marked preference for saline conditions. Two of them are tropical strand-plants. The third species grows along the ocean in temperate eastern Asia, in more or less saline soils along streams and about inland seas in Central Asia and eastern Europe. The corky exocarp evidently adapts the three species for water dispersal. The nature of the hairy covering of these three species is of an essentially similar type, consisting of slender silky hairs rather different in texture and appearance from that predominating among the species of true *Tournefortia*.

The generic name *Messerschmidia* (also spelled *Messersmidia* and *Messerschmidtia*) is based upon *Tournefortia sibirica* Linn., and is a synonym of *Argusia* (or *Arguzia*). The type-species was first described by Amman in 1739 who applied to it the monomial, *Argusia*, and gave a lengthy description of it based upon notes and specimens made by D. G. Messerschmid in 1724 along what is now the northwestern frontier of Manchuria. The source of this material is given as "Locus in glareosis aridisque apricis Argun fluuii et Iike Dalai Noor in Dauria." Although Amman's monomial was formed from the "loco natali" of the plant, i.e. the Argun River, its author deliberately and repeatedly spelled it "*Argusia*"! Amman states that seeds from Messerschmid's collection germinated and grew in the gardens at St. Petersburg. These same cultures are probably those described and illustrated by Hebenstreit in 1763. The plants growing in the Upsala Garden in 1748 and described by Linnaeus as *Messersmidia* were probably derived from those grown by Amman. In the Correspondence of Linnaeus, ed. Smith 2: 200 (1821), there is a letter from Amman, dated Nov. 18, 1740, in which questions by Linnaeus concerning *Argusia* are answered and in which it is stated that dried specimens of *Argusia* were being sent him. When he proposed the monomial "*Argusia*," Amman justified his use of a geographic appellation in forming the name, but added that he had no objection if the genus was named after Messerschmid, its original col-

lector. Linnaeus seems to have preferred the latter. The collector's name was spelled "Messerschmid" by his contemporaries. Linnaeus latinized it, "*Messersmidia*," and was consistent in this usage in all his writings. Other writers of the last half of the 18th century, however, spelled it "*Messerschmidia*" and it is so spelled in the paper by Hebenstreit who was the first to use the generic name subsequent to 1753. Writers of the past century tended to spell the generic name "*Messerschmidtia*." The generic name *Messerschmidia* has variant spellings in "*Messersmidia*" and "*Messerschmidtia*." Although clearly based upon, in fact named after the original collector of *Tournefortia sibirica*, the generic name *Messerschmidia* (variously spelled) eventually became associated with two other very diverse groups of *Boraginaceae*. A study of the facts here presented, however, makes it evident that the name "*Messerschmidia*" is only very improperly applied either to the American species of *Tournefortia* sect. *Cyphocyema*, or to Canary Island and South African species of *Heliotropium* as has been done in some large works. In another paper, *Contr. Gray Herb.* 92: 73 (1930), I have given many facts concerning the misuse of the name "*Messerschmidia*." The name was based upon *Tournefortia sibirica* and was originally applied solely to that plant. The type-species of *Messerschmidia* is obviously and logically the original Siberian species.

KEY TO THE SPECIES

- Plant a low herb from rhizomes; inflorescence a loose open corymbose cyme; calyx pedicellate, lobes cuneate; anthers several times as long as broad; fruit pubescent, sunken in at apex; carpels embedded in the center of the corky exocarp; temperate Eurasia1. *M. sibirica*.
- Plant a tree or shrub; inflorescence of scorpioid cymes; calyx sessile, lobes orbicular or oblong; anthers about two times as long as broad; fruit glabrous, apex conic or rounded; carpels occupying the apical half of the fruit, the lower half composed entirely of corky exocarp; tropical strand plants.
- A tree 1-5 m. tall; leaves broadly oblanceolate or obovate, 3.5-9 cm. broad; inflorescence a conspicuous stiff panicle of loosely flowered elongating (up to 8 cm.) scorpioid cymes; corolla-lobes merely imbricate (not plicate) in the bud; anthers partially exerted from the short corolla-tube; fruit dull, breaking in half; apex and dorsal surface of carpels covered with corky exocarpiat tissue; tropics of the Old World2. *M. argentea*.
- A shrub 3-12 dm. tall; leaves narrowly spathulate-linear, 4-10 mm. broad; inflorescence consisting of single or paired long-peduncled very congested short (1-2 cm.) scorpioid cymes; corolla-lobes distinctly plicate in bud; anthers well

included in the cylindrical corolla-tube; fruit brown and lustrous, not breaking in half; apex and dorsal surface of carpels not covered with corky exocarpial tissue; West Indies3. *M. gnaphalodes*.

1. **Messerschmidia sibirica** Linnaeus, Mant. **2**: 334 (1771). *Tournefortia sibirica* Linnaeus, Sp. Pl. 141 (1753); Kusnezow & Popow, Fl. Caucas. Crit. **4**²: 77 (1913). *Messerschmidia Argusia* Linnaeus, Mant. **1**: 42 (1767). *Messerschmidia Argusia* Murray, Syst. Nat. ed. 13, p. 161 (1774); Linnaeus fil. Suppl. Pl. 132 (1781). *Messerschmidia Argunia* Gaertner, Fruct. **2**: 130, tab. 109 (1791). *Tournefortia Argusia* (L.) Roemer & Schultes, Syst. **4**: 540 (1819); Ledebour, Fl. Ross. **3**: 97 (1847-49); Herter, Act. Hort. Petrop. **1**: 503 (1872). *Messerschmidia rosmarinifolia* Willdenow ex Roemer & Schultes, Syst. **4**: 544 (1819). *Tournefortia rosmarinifolia* Willdenow ex Steudel, Nomen. ed. 2, **2**: 693 (1841). *Tournefortia Argusia* var. *rosmarinifolia* (Willd.) Turczaninow, Bull. Soc. Nat. Moscow **23**¹: 498 (1850). *Argusia rosmarinifolia* Steven, Bull. Soc. Nat. Moscow **24**¹: 559 (1851). *Argusia repens* Rafinesque, Sylva Tellur. 167 (1838). *Tournefortia Argusia* var. *latifolia* DeCandolle, Prodr. **9**: 514 (1845); Turczaninow, Bull. Soc. Nat. Moscow **23**¹: 498 (1850). *Tournefortia Argusia* var. *angustior* DeCandolle, Prodr. **9**: 514 (1845); Turczaninow, Bull. Soc. Nat. Moscow **23**¹: 498 (1850). *Tournefortia sibirica* var. *angustior* Turczaninow ex Fedtchenko, Consp. Fl. Turkestan **5**: 39 (1913). *Tournefortia Argusia* var. *cynanchoides* Turczaninow ex Steven, Bull. Soc. Nat. Moscow **24**¹: 559 (1851), in synonym. *Argusia Messerschmidia* Steven, Bull. Soc. Nat. Moscow **24**¹: 560 (1851). *Argusia cimmerica* Steven, Bull. Soc. Nat. Moscow **24**¹: 560 (1851). *Heliotropium japonicum* Gray, Mem. Amer. Acad. ser. 2, **6**: 403 (1859).

From Japan, Amur and northern China across Asia, mostly between lat. 40° and 55° N., to Rumania and central Russia; affecting moist gravelly, usually saline soils. For more details on distribution see Ledebour, Fl. Ross. **3**¹: 97 (1847-49); Herter, Act. Hort. Petrop. **1**: 503 (1872) and Kusnezow & Popow, Fl. Caucas. Crit. **4**²: 78 (1913).

2. **Messerschmidia argentea** (Linnaeus), comb. nov. *Tournefortia argentea* Linnaeus fil., Suppl. Pl. 133 (1781). *Tournefortia arborea* Blanco, Fl. Filip. 129 (1837).

A strand-tree widely distributed within the tropics, on islands in the Indian and Pacific oceans.

The distribution of this species is worthy of a detailed statement. The fruit having a corky exocarp is admirably suited for oceanic dispersal. In this it has been very successful. The species is, in fact, one of the

characteristic strand-plants of the Old World Tropics. It is, however, almost exclusively a plant of island-shores. In the Pacific Ocean it ranges from the Paumotas (Ducie Isl.), the Marquesas and Palmyra Island, westward to Bonin Island, the Liu Kiu Islands, Formosa, Tizard Reef (China Sea), "Annam (Turan)," the Philippines, the Moluccas, Timor, tropical Australia, and New Caledonia. In the Indian Ocean it extends from northwestern Australia, Timor and Java, Christmas and Cocos Keeling islands to the Mascarenes, Madagascar (near south end only) and coast of Mozambique (rare), north to Zanzibar, the Seychelles, the Laccadives (Bitrapar in lat. $11^{\circ}30'$ N.), the Maldives, Ceylon, the Andamans (Great Coco Isl. in lat. 14° N.), the Nicobars, the islands (Vogel, lat. $7^{\circ}46'$ N.; Adang calat, lat. $6^{\circ}30'$ N.) off the west coast of peninsular Siam, and the northwestern Federated Malay States ("Kedah"). Miquel, Prodr. Fl. Sumatra, 244 (1855), reports it vaguely from Sumatra. I have seen no material from Sumatra, Borneo or the Celebes. Except for the record from Indo-China and the vague record for the Malay States the species is not known from the Asiatic continent. In Africa it is reported only from the Mozambique Coast. The record for Amboland (*Schinz* 757), found in the Flora of Tropical Africa, 4²: 30 (1905), is evidently a clerical error for the specimen cited is *Heliotropium tuberosum*!

The original description of *T. argentea* is based upon material collected on the coast of Ceylon by König. In the Linnean Herbarium there is a characteristic specimen of this plant accompanied by König's label reading "habitat ad Littora maris Zeylanica." Accompanying this is a label in the script of the younger Linnaeus reading "Konig, 1777." The *Buglossum lanuginosum* of Rumphius, cited by the younger Linnaeus, is evidently conspecific with König's material from Ceylon. DeCandolle, Prodr. 9: 514 (1845), cites *T. velutina* Smith as a possible synonym of *T. argentea*. Smith's plant, however, is a very different species being a synonym of *T. arborescens* Lam. of Reunion.

3. **Messerschmidia gnaphalodes** (Linnaeus), comb. nov. *Heliotropium gnaphalodes* Linnaeus, Syst. ed. 10, p. 913 (1759) and Amoen. Acad. 5: 394 (1760). *Tournefortia gnaphalodes* (L.) R. Brown ex Roemer & Schultes, Syst. 4: 538 (1819). *Mallotonia gnaphalodes* (L.) Britton, Ann. Mo. Bot. Gard. 2: 47 (1915).

A strand-plant widely distributed in the West Indies.

According to Millspaugh, Publ. Field Mus., Bot. 2: 89 (1900), this species grows "On the beach line facing the open sea, [and is] very seldom, if ever, found in bays or where partially dry reefs guard the

shore." Its range may be stated as follows: Bermuda, the Bahamas (north to about lat. 27° N.), southern peninsular Florida (to Miami region) and the Greater Antilles, southward to Granada (in the Lesser Antilles), the islands off Venezuela, the Paraguana Peninsula of northwestern Venezuela (Medanos Isthmus) and westward to Alacran Reef (north of Yucatan), the coasts of Yucatan, Cozumel Island, and Swan Island (off Honduras). The species has been reported from the "Society Islands" in Polynesia by Hooker & Arnott, Bot. Beechey Voy. 67 (1832), but as Drake, Fl. Polynés. Franç. 130 (1893), has stated this is probably the result of some error. This West Indian species is certainly not to be expected in the South Pacific.

This species was founded by Linnaeus entirely upon an illustration and phrase-name given by Plukenet, Phytogr. tab. 193, fig. 5 (1691). This basic phrase-name is as follows: "Heliotropium gnaphaloides litoreum frutescens Americanum *Sea Lavender*, Barbadosibus dictum." From it we may suppose that Plukenet's material came from the Barbados.

DOUBTFUL AND EXCLUDED NAMES

Tournefortia angustifolia (Lam.) Roemer & Schultes, Syst. 4: 539 (1819). — *Heliotropium messerschmidoides* Kuntze.

Tournefortia angulosa Desfontaines, Tab. ed. 2, 85 (1815). — A bare name in a garden-list.

Tournefortia bifida Lamarck, Tab. Encyc. 1: 417 (1791); Poiret, Encyc. 5: 360 (1804); Poiret, Dict. Sci. Nat. 41: 177 (1826); Smith in Rees, Cyclop. 36: sub sp. no. 25 (1819); Baker, Fl. Mauritius, 202 (1877). — The type of this species was collected on l'Ile de France by Commerson and represents *Antirhea frangulacea* DeCandolle, Prodr. 4: 460 (1830)! The correct name for this Mauritian species of *Rubiaceae* is, accordingly, **Antirhea bifida** (Lam.), comb. nov.

"**Tournefortia cymosa** Heyne in Herb. Rottler, not of Linn." ex Clarke in Hooker, Fl. Brit. India 4: 145 (1883). — This reference concerns a small specimen at Kew which may possibly represent *T. Bojeri* of Mauritius. It is certainly not *T. Heyneana* as given by Clarke! The specimen bears a printed label reading: "Herbarium Rottlerianum; Penins. Indiae Orientalis; Presented by the Council of Kings College, Feb. 1872." Accompanying this are two labels in script giving the determination as *T. cymosa* Swartz and the collector as Macé. Clarke's citation accordingly is merely a reference to a misdetermined specimen in the Kew herbarium.

Tournefortia Edgeworthii A. DeCandolle, Prodr. 9: 529 (1845). — *Heliotropium zeylanicum* Burman.

Tournefortia fruticosa (Linn. f.) Ker, Bot. Reg. 6: tab. 464 (1820). — *Heliotropium messerschmidioides* Kuntze.

Tournefortia linearis E. Meyer in Drege, Flora 26²: Beigabe p. 57 and 226 (1843), nomen. — *Heliotropium lineare* (E. Meyer) Wright.

Tournefortia Messerschmidia Sweet, Hort. Suburb. London 31 (1818), nomen subnudum. — *Heliotropium messerschmidioides* Kuntze.

Tournefortia micranthos (Bunge) A. DeCandolle, Prodr. 10: 67 (1846); Ledebour, Fl. Ross. 3: 98 (1847-49). — *Heliotropium micranthos* (Bunge) Boissier.

Tournefortia mollis A. Bertoloni, Misc. Bot. 12: 44, tab. 1 (1852). — Based upon material from Mozambique representing *Vangueria tomentosa* Hochst. This species of Bertoloni's is not mentioned in Robyn's recent monograph of *Vangueria*, Bull. Jard. Bot. Brux., vol. 11 (1928).

Tournefortia mutabilis Ventenat, Choix Pl. tab. 3 (1803). — The basis of this species was given by Ventenat as follows: "Arbrisseau originaire de Java, cultivé chez Cels et au Muséum d'Histoire Naturelle, de semences rapportées par La Haye." I have seen Ventenat's original material in the Delessert Herbarium at Geneva and duplicates of it at Kew, Berlin and Paris. The plant is evidently not a species of the Old World, in fact, it appears to be a form of the Mexican *T. Hartwegiana* Steud. Since Ventenat's name is much older than *T. Hartwegiana* it must be taken up in place of the latter. La Haye (or Lahaia) was a gardener who travelled to the East Indian Islands collecting seeds and plants which were subsequently grown at the garden of J. M. Cels and at the Jardin des Plantes at Paris. Since he is not known to have visited America it is evident that all of Ventenat's original data are incorrect.

Tournefortia Royleana DeCandolle, Prodr. 9: 527 (1845). — *Heliotropium zeylanicum* Burman.

Tournefortia stenoraca Klotzsch in Peters, Reise Mossamb. 250 (1861). — *Heliotropium zeylanicum* Burman.

Tournefortia subulata Hochstetter ex DeCandolle, Prodr. 9: 528 (1844). — *Heliotropium zeylanicum* Burman.

Tournefortia tuberculosa Chamisso, Linnaea 4: 467 (1829). — *Heliotropium tuberosum* (Cham.) Gürke.

Tournefortia zeylanica (Burman) Wight, *Illust. Ind. Bot.* **2**: 211, tab. 170 (1850). — *Heliotropium zeylanicum* Burman.

Messerschmidia angustifolia Lamarck, *Tab. Encyc.* **1**: 415 (1791). — *Heliotropium messerschmidoides* Kuntze.

Messerschmidia cancellata d'Asso, *Synop. Aragon.* 21, tab. 1 (1779). — *Rochelia* species.

Messerschmidia floribunda Salisbury, *Prodr.* 112 (1796). — *Heliotropium messerschmidoides* Kuntze.

Messerschmidia fruticosa Linnaeus fil. *Suppl.* 132 (1781). — *Heliotropium messerschmidoides* Kuntze.

Messerschmidia hispida Bentham in Royle, *Ill. Bot. Himal. Mts.* 306 (1836). — *Heliotropium zeylanicum* Burman.

Heliotropium pannifolium Burchell ex Hemsley, *Voy. Challenger, Bot.* **2**: 78 (1884). — This species from St. Helena is known only from Burchell's material. It is now probably exterminated. I have studied Burchell's unpublished drawing of the plant and his specimen at Kew. The plant is evidently a strong shrub much resembling the *Eutournefortiae* of the Andes in foliage and habit of growth. I know of no *Heliotropium* that could be recognized as a close relative of it nor one that could be said to resemble it in gross habit. Burchell's specimen is in the flowering condition only. The corollas, most unfortunately, have been almost completely eaten away by insects. There are consequently no reproductive structures on the type which might help in definitely placing the St. Helena plant generically. Since the plant is no doubt extinct and no further specimens are to be expected, the species will probably remain one of dubious generic affinities, and since a nomenclatorial transfer would add nothing to our regrettably small knowledge of it, I am not giving this obscure plant a new name under *Tournefortia*. However, I do strongly suspect that it belongs in that genus.

2. NOTES ON BRAND'S TREATMENT OF CRYPTANTHA

The treatment of *Cryptantha* by Brand appeared in the second and posthumous volume he contributed on the *Boraginaceae* in "Das Pflanzenreich." It is based almost exclusively upon the material available to him in the German herbaria. Having had no field experience in Western America and having had no opportunity to examine either the very numerous types or the great collections of *Cryptantha* in American herbaria, it is not surprising to find that Brand's treatment of the genus contains numerous errors arising from his restricted opportunities for

the study of this large, difficult and characteristic West American genus. I have found some of Brand's statements very puzzling. Hence it is that during a recent visit in Germany I took the opportunity of studying the material available to him and, in the light of these studies, made copious annotations in copies of his published work on the *Boraginaceae*. The data given here concern *Cryptantha* and embody the notes correcting Brand's more serious errors, as well as those clarifying the more puzzling details of his work on that genus. In the following discussion, as a heading for the pertinent notes, I have given the specific name accepted by Brand and have preceded it by the number under which the species may be found in his treatment. Following these is an abbreviated reference to the page of the *Pflanzenreich*, iv. 252² [Heft 97] pp. 28-75 (1931), on which the given species may be found.

5. ***Cryptantha macrocalyx*** (Phil.) Reiche; Brand, *Pflanzenr.* 30 (1931). — The specimen cited and described is evidently a duplicate of the material to be found in Philippi's Herbarium at Santiago labelled as collected by San Roman in Quebrada de Serna. The material is so poor that I can add nothing to my previous discussion, *Contr. Gray Herb.* 78: 70 (1927), of this peculiar plant. It is most certainly not *C. macrocalyx*.

6. ***Cryptantha Buchtienii*** Brand, *Pflanzenr.* 30 (1931). — I have studied the type-specimen. It is a form of *C. glomerata* from a locality in which it has been repeatedly collected.

7. ***Cryptantha phacelioides*** (Clos) Reiche; Brand, *Pflanzenr.* 31 (1931). — Brand cites two specimens as seen. The collection by Philippi, from which Brand's description is derived, is an isotype of *Eritrichium Rengifoanum* Phil., which I consider to be a phase of *C. aprica* (Phil.) Reiche. I have not seen the material collected by Buchtien, which is cited by Brand, but suspect that it may be *C. glomerulifera* (Phil.) Johnston, which Buchtien obtained at 2400 m. alt. near Juncal. Neither the name used by Brand nor any of the supposed synonyms he lists belong to either of these species I have mentioned. The synonyms he lists belong to three distinct species.

9. ***Cryptantha talquina*** (Phil.) Brand, *Pflanzenr.* 32 (1931). — This species is unquestionably a synonym of *C. alyssoides* (DC.) Reiche. Brand attempted to separate it by stating that basal cleistogenes were present in *C. talquina* and absent in *C. alyssoides*. This is contrary to fact. An isotype of *C. alyssoides* in the DeCandolle Herbarium at Geneva shows a fine display of these cleistogenes. The type at Paris has had them all knocked off.

12. **Cryptantha candelabrum** Brand, Pflanzenr. 33 (1931).—Based upon three collections, all from Philippi. These are: 1. Santiago, "*Philippi* (sub *E. congestum*), 2. Santiago, "*Philippi dedit 1876*" (sub *E. congestum*) and 3. Prov. de Santiago, "*Philippi dedit 1876*" (sub *E. lineare*; "Dimorphocarpum est"). The first specimen has flowers and fruit. The second and third show flowers only. For evident reasons the first specimen is selected as type. It is a form of *C. linearis* (Colla) Greene. The other specimens are quite similar and probably represent immature *C. linearis* or perhaps even *C. aprica*.

13. **Cryptantha fallax** (Phil.) Reiche; Brand, Pflanzenr. 33 (1931).—The specimen from Philippi, cited by Brand, seems to represent *C. Kingii* (Phil.) Reiche. The chasmogamic flowers are in bud only. The label associated with the specimen is in the script of Philippi. There is a question mark following the locality, "La Serena."

15. **Cryptantha campylotricha** Brand, Pflanzenr. 34 (1931).—This species is a synonym of *C. Kingii* (Phil.) Reiche.

16. **Cryptantha diffusa** (Phil.) Johnston; Brand, Pflanzenr. 34 (1931).—The single specimen cited, that collected by Philippi at Paihuano, represents *C. globulifera* (Clos) Reiche.

17. **Cryptantha modesta** Brand, Pflanzenr. 35 (1931).—This species is a synonym of *C. diplotricha* (Phil.) Reiche.

19. **Cryptantha Vidalii** (Phil.) Reiche; Brand, Pflanzenr. 35 (1931).—The only specimen examined by Brand is one grown in the Berlin Garden. It seems to be a form of *C. glomerata* Lehm. It is of course not authentic *C. Vidalii*.

21. **Cryptantha Candolleana** Brand, Pflanzenr. 36 (1931).—This species is based upon specimens from Macrae, Gay, Besser, and two from Philippi. At Berlin there is no specimen of this species collected by Gay in "Colchagua," but there is one given as from "Chile." All the material of this species cited by Brand represents forms of *C. glomerata* Lehm.

25. **Cryptantha globulifera** (Clos) Reiche; Brand, Pflanzenr. 37 (1931).—The only specimen cited by Brand seems to represent *C. linearis* (Colla) Greene. The specimen is immature. The corollas are evident.

28. **Cryptantha capituliflora** (Clos) Reiche, var. **compacta** Brand, Pflanzenr. 38 (1931).—The single specimen cited of this variety rep-

resents a stunted compact form of *C. diplotricha* (Phil.) Reiche. Brand does not appear to have seen any specimens of the true *C. capituliflora*.

33. **Cryptantha barbiger**a (Gray) Greene; Brand, Pflanzenr. 39 (1931). — Among the three specimens cited, those of Jones and of Heller represent this species. That collected by Greene represents typical *C. nevadensis* Nels. & Kenn.

34. **Cryptantha nevadensis** Nelson & Kennedy; Brand, Pflanzenr. 39 (1931). — The collection by Rusby, in the Dehra Dun Herbarium, which I examined while still on loan at Berlin, represents *C. barbiger*a (Gray) Greene.

38. **Cryptantha affinis** (Gray) Greene; Brand, Pflanzenr. 42 (1931). — The material at Berlin of Heller 5882 is good *C. Torreyana* (Gray) Greene and that of Jones 856 is at least in part good *C. affinis*. The data on the latter collection is probably questionable.

39. **Cryptantha microstachys** Greene; Brand, Pflanzenr. 42 (1931). — The single specimen cited by Brand, Jones 3138 from San Diego, is *C. Clevelandi* Greene.

40. **Cryptantha Lyallii** Brand, Pflanzenr. 42 (1931). — This is a synonym of *C. flaccida* (Dougl.) Greene, all the cited material falling readily into that species.

49. **Cryptantha Hossei** Brand, Pflanzenr. 45 (1931). — This is an evident synonym of *C. diplotricha* (Ph.) Reiche.

63. **Cryptantha Famatinae** Brand, Pflanzenr. 49 (1931). — The type of this species represents *C. diffusa* (Phil.) Johnston.

66. **Cryptantha parvula** (Phil.) Brand, Pflanzenr. 50 (1931). — Of the three specimens cited, Philippi 694 is *C. diffusa* (Phil.) Johnston, that from Caldera is a form of *C. globulifera* (Clos) Reiche, and that from San Roman is *C. diffusa*.

75. **Cryptantha leiocarpa** (Fisch. & Mey.) Greene, var. **eremocaryoides** Brand, Pflanzenr. 53 (1931). — This is apparently an odd form of *C. leiocarpa*.

81. **Cryptantha confusa** Rydberg; Brand, Pflanzenr. 56 (1931). — Among the specimens cited, Leiberg 2271, is *C. Watsoni* (Gray) Greene, the remainder represents *C. affinis* (Gray) Greene.

83. **Cryptantha Fendleri** (Gray) Greene; Brand, Pflanzenr. 57 (1931). — Greene's material from Beaver Creek is *C. ambigua* (Gray) Greene.

84. **Cryptantha Torreyana** (Gray) Greene, Brand, Pflanzenr. 57 (1931). — In the Berlin collections *Rydberg & Bessey 4885* and *Heller 9074* represent *C. ambigua* (Gray) Greene.
85. **Cryptantha Rattanii** Greene; Brand, Pflanzenr. 58 (1931). — The cited material at Berlin is in flower only. The corolla is 3–5 mm. broad. It is probably a form of *C. hispidissima* Greene.
86. **Cryptantha grandiflora** Rydberg, var. **anulata** Brand, Pflanzenr. 59 (1931). — This is a form of *C. Hendersoni* (Nels.) Piper.
91. **Cryptantha hispidula** Greene ex Brand, Pflanzenr. 60 (1931). — The type is *Baker 2966* from Napa County. The collections from Elmer and Eastwood are *C. Clevelandi* var. *florosa* Johnston.
91. **Cryptantha hispidula** var. **Elmeri** Brand, Pflanzenr. 60 (1931). — The cited material represents one of the forms of *C. Hendersoni* (Nels.) Piper having a single polished nutlet.
92. **Cryptantha flaccida** (Dougl.) Greene; Brand, Pflanzenr. 60 (1931). — The specimen collected by Congdon, no. 72, near Soledad represents *C. decipiens* var. *corollata* Johnston.
94. **Cryptantha hispida** (Phil.) Reiche; Brand, Pflanzenr. 61 (1931). — The cited specimen is an isotype of the very different *C. Romanii* Johnston.
96. **Cryptantha albida** (H. B. K.) Johnston; Brand, Pflanzenr. 63 (1931). — Among the cited specimens *Fendler 635* represents *C. Fendleri* (Gray) Greene, and the collection by Echegaray represents *C. diplo-tricha* (Phil.) Reiche.
106. **Cryptantha granulosa** (Ruiz & Pav.) Johnston; Brand, Pflanzenr. 65 (1931). — Two of the cited collections, *Weberbauer 5693* and *5700*, represent *C. limensis* (A. DC.) Johnston.
107. **Cryptantha Philippiana** Brand, Pflanzenr. 66 (1931). — This is a form of *C. glomerata* Lehm. having a developed chasmogamic inflorescence.
108. **Cryptantha mirabunda** Brand, Pflanzenr. 66 (1931). — I consider this species to be a synonym of *C. utahensis* (Gray) Greene.
113. **Cryptantha ambigua** (Gray) Greene, forma **robustior** Brand, Pflanzenr. 69 (1931). — The material cited from California all represents *C. echinella* Greene. One collection by Howell, no. 48, is *C. simulans* Greene.

115. **Cryptantha Stuebelii** Brand, Pflanzenr. 69 (1931). — The type of this species, from Yosemite Valley, is an equal mixture of *C. muricata* var. *Jonesii* (Gray) Johnston, and *C. simulans* Greene. Hansen's collection seems to be young *C. simulans*.

121. **Cryptantha Hansenii** Brand, Pflanzenr. 71 (1931). — This represents one of the puzzling forms of *C. intermedia* (Gray) Greene found in the foothills of the central Sierra Nevadas. The variety *pulchella* Brand, is merely an immature specimen of this Sierran form.

3. NEW OR OTHERWISE NOTEWORTHY SPECIES

Cordia Weddellii sp. nov., arbuscula 3–4 m. alta laxe ramosa pilis malpighiaceis strigosa; ramulis pallide strigosis; foliis ellipticis 2.5–4 cm. longis 1.5–2.5 cm. latis utrinque strigosis, nervis 7–10-jugis rectis parallelibus inconspicue sparseque ramosis, subtus pallidioribus, margine integris, apice rotundis, petiolis gracilibus 5–9 mm. longis; floribus ad apicem ramulorum in cymulis parvis 3–10-floris breviter pedunculatis affixis; calyce ad anthesim ca. 1 mm. longo, apice irregulariter disrumpente, extus strigoso obscure multisulcato; corolla alba ca. 3 cm. longa extus pilosa intus glabra, tubo ca. 1 cm. longo 3–4 mm. crasso, faucibus late ampliatis, lobis 5 suborbiculatis ca. 1 cm. longis rotundis ascendentibus in alabastro valde plicatis; staminibus 5, supra (4 mm.) basem tubi affixis, filamentis inaequalibus 5 et 6 mm. longis glabris; antheris oblongis 2–2.5 mm. longis; stylo 4 mm. profunde lobato basim versus sparsissime setifero, lobis 1.5 mm. lobulatis, lobulis spathulatis; ovario glabro; fructu ignoto.

BOLIVIA: Prov. of Chiquitos, small shrub 3–4 m. tall at edge of forest, fl. white, Sept.-Oct. 1845, *Weddell 3454* (TYPE, Paris).

A very remarkable species of the section *Eucordia* and related to *C. aberrans* Johnston (*C. mucronata* Fres.) and *C. candida* Vell. These two relatives come from the Brazilian coast near Rio Janeiro. *Cordia Weddellii* was collected in the extreme eastern section of the Dept. of Santa Cruz, Bolivia, and is distinguished at once by its malpighiaceous hairs. This type of pubescence is extremely rare in *Cordia*. In the present species it is particularly interesting since the mid-section of each hair (above where it is attached) is glandular and thickened.

Cordia aberrans, nom nov. *Cordia mucronata* Fresenius in Martius, Fl. Bras. 8¹: 9 (1857); Johnston, Contr. Gray Herb. 92: 42 (1930); not Poiret (1818).

The existence of an earlier homonym makes it necessary to rename

this remarkable species. The type has been examined at Munich. It is labeled: "Inter Vittoria et Bahia; S. Princ. Maxim. Vidensis; Martius comunc. 1856."

Cordia taguahyensis Vellozo, Fl. Flum. 98 (1825) and Icones, **2**: tab. 154 (1827). *Cordia amplifolia* Mez, Bot. Jahrb. **12**: 538 (1890); Johnston, Contr. Gray Herb. **92**: 62 (1930); not A. DeCandolle (1845). *Lithocardium Mezianum* Kuntze, Rev. Gen. **2**: 976 (1891). *Cordia Meziana* (Kuntze) Gürke in Engler & Prantl, Nat. Pflanzenf. IV. Abt. 3a, p. 84 (1893).

An examination of the type of *C. amplifolia*, at Munich, proves it to be simply a very large-leaved northern form of *C. taguahyensis*. Blanchet has collected similar luxuriant forms in Bahia.

Cordia revoluta Hooker fil. Trans. Linn. Soc. London **20**: 199 (1847); Riley, Kew Bull. **1925**: 225 (1925). *Varronia revoluta* Hooker fil. ex Andersson, Kung. Svensk. Vet. Akad. Handl. **1853**: 204 (1855); Andersson, Freg. Eugenies Resa, Bot. 84 (1861). *Lithocardium revoluta* (Hook. f.) Kuntze, Rev. Gen. **2**: 977 (1891). *Sebestena revoluta* (Hook. f.) von Friesen, Bull. Soc. Bot. Genève, sér. 2, **24**: 183 (1933). *Cordia linearis* Hooker fil., Trans. Linn. Soc. London **20**: 199 (1847), not DeCandolle (1845). *Varronia linearis* Hooker fil. ex Andersson, Kung. Svensk. Vet. Akad. Handl. **1853**: 204 (1855) and Freg. Eugenies Resa, Bot. 84, tab. 11, fig. 4 (1861). *Sebestena linearis* (Hook. f.) von Friesen, Bull. Soc. Bot. Genève sér. 2, **24**: 182 (1933). *Lithocardium Hookerianum* Kuntze, Rev. Gen. **2**: 976 (1891). *Cordia Hookerianum* (Kuntze) Gürke in Engler & Prantl, Nat. Pflanzenf. IV, Abt. 3a, p. 83 (1893).

GALAPAGOS ISLANDS: Narborough: *Stewart* 3177; *Snodgrass & Heller* 327. Albemarle: *Snodgrass & Heller* 28, 155, 196, 272, 897; *Stewart* 3169, 3170, 3172, 3173; *Baur* 213; *Macrae* (cotype of *C. revoluta*). James: *Stewart* 3175, 3176; *Cheesman* 388; *Darwin* (TYPE of *C. linearis*). Charles: *Baur* 214; *Schimpff* 215; *Darwin* (TYPE of *C. revoluta*).

I have had the opportunity of examining the types of *Cordia*, from the Galapagos Islands, described by Hooker and by Andersson. The study of this critical material, supplementing a careful examination of the large general collections from the islands preserved at the Gray Herbarium, has established specific identities which necessitate changes in the names currently applied to the island species. The above cited species and the three following are the only endemic species of *Cordia* on the islands. All belong to the section *Varronia*. While it may be generally stated that they are most closely related to the species of

western Peru and Ecuador, their immediate relationships on the continent are quite obscure. The three following species are closely related to one another but probably not immediately related to the well marked *C. revoluta*. The following key will aid in distinguishing the four insular endemics:

- Corolla elongate, tubular, length of tube 3–4 times the breadth of the weakly developed limb; leaves linear; stems and upper surfaces of the leaves covered with stout short appressed falcate hairs; inflorescence capitate *Cordia revoluta* Hook f.
- Corolla coarsely funnelform, length of tube less than 2 times width of the conspicuous spreading limb; leaves lanceolate; stems and upper surfaces of leaves with erect or ascending (at times minute) hairs; inflorescence tending to elongate; flowers short-stipitate at maturity.
- Upper surface of leaves with abundant minute stout forked hairs *Cordia Anderssoni* Gürke
- Upper surface of leaves with stiff slender spreading simple hairs.
- Stems and lower surface of leaves bearing a mixture of minute appressed forked or stellate hairs and coarser stiff erect simple hairs *Cordia Scouleri* Hook. f.
- Stems and lower surface of leaves with only stiff erect simple hairs *Cordia leucophlyctis* Hook, f.

Cordia Scouleri Hooker fil., Trans. Linn. Soc. London **20**: 200 (1847). *Varronia Scouleri* Hooker fil. ex Andersson, Kungl. Svensk. Vet. Akad. Handl. **1853**: 204 (1855) and Freg. Eugenies Resa, Bot. 83 (1861). *Lithocardium Scouleri* (Hook. f.) Kuntze, Rev. Gen. **2**: 977 (1891).

GALAPAGOS ISLANDS: Albemarle: *Stewart* 3162. James: *Baur* 209; *Scouler* (TYPE). Indefatigable: *Svenson* 7.

This plant is particularly close to the two following. It appears to be rare. The few collections seen, other than the type, are all mis-determined as *C. galapagensis* or *C. leucophlyctis*. The mixed pubescence on the leaves and stems decisively separates it from those species.

Cordia Anderssoni (Kuntze) Gürke in Engler & Prantl, Nat. Pflanzenf. IV. Abt. 3a, p. 83 (1893). *Lithocardium Anderssonii* Kuntze, Rev. Gen. **2**: 976 (1891). *Varronia canescens* Andersson, Kungl. Svensk. Vet. Akad. Handl. **1853**: 203 (1855) and Freg. Eugenies Resa, Bot. 83, tab. 11, fig. 2 (1861), not *Cordia canescens* HBK. (1818).

GALAPAGOS ISLANDS: Albemarle: *Stewart* 3195. Abingdon: *Stewart* 3158. James: *Stewart* 3157. Duncan: *Baur* 215. Charles: *Lee*; *Andersson* (TYPE). Chatham: *Stewart* 3165, 3166; *Baur* 216; *Andersson* (det. *V. leucophlyctis*).

Cordia leucophlyctis Hooker fil. Trans. Linn. Soc. London **20**: 199 (1847). *Varronia leucophlyctis* Hooker fil. ex Andersson, Kungl. Svensk. Vet. Akad. Handl. **1853**: 203 (1855) and Freg. Eugenies Resa, Bot. 83 (1861). *Lithocardium leucophlyctis* (Hook. f.) Kuntze, Rev. Gen. **2**: 977 (1891). *Varronia scaberrima* Andersson, Kungl. Svensk. Vet. Akad. Handl. **1853**: 202 (1855) and Freg. Eugenies Resa, Bot. 82, tab. 11, fig. 3 (1861), not *Cordia scaberrima* HBK. (1818). *Lithocardium galapagosenum* Kuntze, Rev. Gen. **2**: 976 (1891). *Cordia galapagensis* (? Kuntze) Gürke in Engler & Prantl, Nat. Pflanzenf. IV. Abt. 3a, p. 83 (1893).

GALAPAGOS ISLANDS: Narborough; *Snodgrass & Heller* 331, 342. Albe-marle: *Snodgrass & Heller* 75, 136, 195, 291, 857, 881, 893; *Stewart* 3159; *Baur* 210, 212; *Macrae*; *Darwin* (TYPE of *C. leucophlyctis*). Indefatigable: *Baur* 211; *Andersson* (TYPE of *Varronia scaberrima*). Barrington: *Stewart* 3164. Hood: *Stewart* 3168.

The type of *C. leucophlyctis* and *Varronia scaberrima* are remarkably similar. The plant illustrated as *V. leucophlyctis* by Andersson, Freg. Eugenies Resa, Bot. tab. 11, fig. 1 (1861), appears to be *Cordia Anderssoni* from Chatham Island.

Cordia setigera, sp. nov., dumosa; ramulis gracilibus strigulosis; foliis lanceolatis 3–6.5 cm. longis 12–24 mm. latis tenuibus, apice acutis, basi cuneatis, margine evidenter irregulariterque arguto-dentatis, dentibus apiculatis, faciebus pilis numerosis 0.5–1 mm. longis ascendentibus asperatis (basibus pilorum saepe pustulatis) subtus pallidioribus, nerviis 4–6-jugatis perinconspicue pauceque ramosis, petiolis 1–5 mm. longis; pedunculis terminalibus gracillimis 1–7 cm. longis; inflorescentia congesto-capitatis 7–10 mm. diametro; corolla alba infundibuliformi 15–18 mm. longa, limbo ascendenti ca. 1 cm. diametro, lobis rotundis ca. 3 mm. longis; calycibus ad anthesim ca. 6 mm. longis sparse strigosis, tubo 2–2.5 mm. longo et crasso, lobis triangularibus ca. 1–1.5 mm. longis, apice linearibus 2–3 mm. longis attenuatis; fructu ca. 5 mm. longo apice exserto.

BRAZIL: near Fazenda de Bom Jardim, Rio Jequitinhonha, in northeastern Minas Geraes, 1817, *St. Hilaire B*¹ 1478 (TYPE, Paris).

A very well marked species which keys out with *Cordia grandiflora* and *C. paucidentata* in my revision of the Brazilian species of *Cordia*, cf. Contr. Gray Herb. **92**: 20 (1930). From both of these species it is distinguished by its smaller corollas, its thin leaves, its sparsely setulose herbage, and its very sparsely strigose calyces. It is evidently a very slender loosely branched bush and hence quite different in habit from the much more southerly ranging *C. paucidentata*. *Cordia grandiflora*

has different pubescence, very much larger differently shaped corollas, and comes from the Amazon Valley. The closest relative of the proposed species is probably *C. Neowediana* DC., of the forests back of Ilhéos, Bahia. That species has more finely serrate, more hairy leaves, larger corollas, much larger brown-hairy calyces, and only short tips on the calyx-lobes. It is a plant of the wet coastal forests, *C. setigera* is a plant of the dry catingas inland.

Cordia Neowediana DeCandolle, Prodr. 9: 498 (1845); Fresenius in Martius, Fl. Bras. 8¹: 23 (1857), as *C. Neowidiana*; Johnston, Contr. Gray Herb. 92: 64 (1930). *Varronia macrocephala* sensu Nees & Martius, Nov. Acta Acad. Caes. Leop.-Carol. Nat. Cur. 11: 78 (1823). *Lithocardium Neowiedianum* (DC.) Kuntze, Rev. Gen. 2: 977 (1891).

The type of this species is preserved at Brussels. Through the kindness of Prof. W. Robyns I have had the privilege of borrowing it for study. The species is a well marked one and is certainly worthy of recognition. The single collection upon which it is based was obtained in southern Bahia, in the country back of Ilhéos. It is one of the species of the section *Varronia* having the flowers capitately congested. The large white corollas, in size and shape, are very suggestive of those found in the distantly related *C. paucidentata*. The stems, calyces and both leaf-surfaces are conspicuously bristly. There is no other kind of pubescence. The hairs are stiffish, spreading and mostly ca. 2 mm. long. Most of them spring from a small pustulate base. The hairs on the calyx are brown. The leaves are lanceolate, serrate and about 7 cm. long and 2 cm. broad. The calyx is ca. 1 cm. long, bristly, and sparsely glandular above the middle. The lobes are nearly 3 mm. long and triangular with a short subulate tip 1–1.5 mm. long. In my revision of the Brazilian species, l. c. p. 20, *C. Neowediana* keys out with *C. longifolia*, *C. poliophylla* and *C. leucocephala*, which are rather closely related to it. From these three species it can be quickly distinguished by its very bristly leaves and much larger bristly calyx.

Cordia Braceliniae, sp. nov., fruticosa diffusa; caulibus ca. 3 dm. longis laxe ramosis strigosis; foliis elliptico-obovatis vel oblanceolatis 2–3 cm. longis 10–17 mm. latis basim versus attenuatis, apice obtusis, margine crenatis, nervis 3–5-jugatis rectis ascendentibus vix ramosis supra impressis subtus prominentibus, facie laminae superiore sparse rigideque strigosis pilis pustulae insidentibus, facie inferiore pallidioribus strigosis vix pustulatis; pedunculis terminalibus gracilibus 2–3 cm. longis strigosis; inflorescentia capitata ca. 8 mm. diametro 20–25-flora; calycibus inflatis sparse strigosis ca. 3 mm. longis tubo pallido, lobis

triangularibus viridibus ca. 1.5 mm. longis breviter ca. 0.5 mm. longeque attenuatis; corolla alba 10–15 mm. longa; fructu irregulariter turbinato lacunoso vix exserto.

BRAZIL: Corinto beyond Retiro, Fazenda do Diamante, Minas Geraes, 590 m. alt., in thickety grassland, low spreading bush, fl. white and early deciduous, April 14, 1931, *Ynez Mexia 5617* (TYPE, Gray Herb.; isotype, Arn. Arb.).

A very distinct species perhaps most closely related to *C. paucidentata* of southern Brazil and adjacent regions. It is quickly separated from that species by its low branching habit, sparse strigose indument, and short-appendaged calyx-lobes. In my treatment of the Brazilian species of *Cordia*, Contr. Gray Herb. **92**: 20 (1930), it keys out with *C. latifolia*, *C. poliophylla* and *C. leucocephala*, though it does not seem closely related to any of them. From these species, however, it is readily distinguished by its low spreading habit, small leaves lacking in secondary nervation, and different pubescence. The proposed species is strigose on the leaves, younger stems, peduncles and calyx. The hairs are abundant but do not cover the leaf-surfaces. They are stiff, straight and closely appressed. Those on the upper leaf-surface spring from small disks of dark mineralized cells. The type material has shrivelled corollas only. It has been distributed incorrectly determined as "*C. truncata*."

I find it a pleasure to associate with this well marked species the name of Mrs. H. P. Bracelin, of California. Her effective handling and distribution of the extensive collections of Mrs. Mexia make it fitting that her name should be associated with them and that it should be remembered by the students of the Brazilian flora.

Cordia campestris Warming, Kjoeb. Vidensk. Meddel. **1867**: 12, fig. 2 (1868).

BRAZIL: Minas Geraes: Lagoa Santa, Pinhões, in campis, Jan. 28, 1866, *Warming* (Copenh., TYPE); Lagoa Santa, in campis ad Cabejeiras da lagoa, March 8, 1864, *Warming* (Copenh.); Formigas, *St. Hilaire sine no.* (Paris); indefinite, *Claussen 221* (G, K, Copenh., Stockh., Paris). Goyaz: Formosa, shrub, corolla white, Dec. 24, 1894, *Glaziou 21781* (K, BD, Paris).

Warming's species has been treated by me, Contr. Gray Herb. **92**: 29 (1930), as a synonym of *C. multispicata* Cham. and several of the above collections cited under that species. *Cordia campestris* is very distinct from *C. multispicata*, however, and probably most closely related to *C. verbenacea* DC. and *C. chacoensis* Chodat, particularly to the latter. Among the Brazilian spicate species of the *Varronia* section, *C. multispicata* is readily recognized by having the pedunculate spikes prevail-

ingly lateral (and axillary) and the petiole of the subtending leaf evidently decurrent upon the peduncle, quite in the manner observable in *C. buddleyoides* Rusby, *C. axillaris* Johnston, and *C. guazumaefolia* (Desv.) R. & S. The specimens I have cited above, including the type of *C. campestris*, have terminal spikes and the petioles not decurrent on the peduncles. They are quickly separable from *C. verbenacea* by having the upper leaf-surface abundantly and evidently hairy. *Cordia campestris* is separated from *C. chacoensis* by its low habit of growth, and general coarseness of its parts. It appears to be a small (under 1 m. tall), sparsely branched shrub of the open country. The leaves are usually 3–5 cm. broad, and the spikes 5–10 cm. long. The flower buds are usually apiculate. It ranges in the campo of Minas Geraes and Goyaz. Its relative, *C. chacoensis*, ranges from southern-most Brazil into Paraguay and across northern Argentina.

Cordia guazumaefolia (Desv.) Roemer & Schultes, Syst. 4: 463 (1819). *Varronia guasumaefolia* Desvaux, Jour. de Bot. 1: 276 (1809). *Lithocardium guazumifolia* (Desv.) Kuntze, Rev. Gen. 3²: 206 (1898). *Cordia axillaris* var. *gymnocarpa* Johnston Contr. Gray Herb. 92: 35 (1930).

In my treatment of the Brazilian species of *Cordia*, l. c. p. 30, I cited *C. guazumaefolia* as a synonym of *C. corymbosa* (L.) Don. A recent study of Desvaux's type at Paris, however, has proved this to be quite incorrect. Among material from Jussieu's herbarium at Paris I have found specimens of this species determined by Desvaux. One of these is labeled, "Brasil, envoyé de Lisbonne pour M. Vandelli 1790." The plant described by Desvaux is evidently that which I treated as *C. axillaris* var. *gymnocarpa*. This plant should bear the name *C. guazumaefolia*. It may be added that while there is an evident relation between *C. axillaris* and true *C. guazumaefolia*, I am now of the opinion that their differences warrant specific rather than mere varietal separation.

Cordia insignis Chamisso, Linnaea 8: 122 (1833). *Cordia Haenkeana* Mez, Bot. Jahrb. 12: 560 (1890).

An examination of the type of *C. Haenkeana*, at Munich, makes it evident that it is only a form of *C. insignis*. The collection is given as having been collected by Haenke in Peru. The accuracy of this data, however, I greatly doubt. *Cordia insignis* is known only east and south of the Amazon Basin, from eastern Brazil to eastern Bolivia, and is certainly not to be expected in Peru.

Cordia laevior, sp. nov., arborescens, 6 m. alta; ramulis fuscis, juventate pilis brevibus adpressis vel ascendentibus vestitis mox glabrescentibus; foliis homomorphis oblongo-lanceolatis 15–26 cm. longis 4–10 cm. latis medium versus latioribus, basi acutis, apice longissime acuminatis, supra in costa et nervis primariis hirsutulis ceteris glabris, subtus pallidioribus, costa et nervis numerosis puberulentibus, nervis 7–8-jugatis, nervis tertiaribus obscuris, petiolis 5–10 mm. longis; cymis in furcis ramulorum ortis laxe ramosis; calyce in alabastro obovato 4–5 mm. longo 2.5–3 mm. crasso pilis minutis abundantibus vestito obscure costato, apice rotundo, lobis 5 plus minusve irregularibus triangularibus; corolla alba, tubo ca. 4 mm. longo, lobis ca. 2 mm. longis et latis, filamentis ca. 3 mm. longis basim versus pilosis; stylo sparse piloso; supra medium ovarii evidenter pilosis; fructu ignoto.

PERU: Pongo de Cainarachi, Rio Cainarachi, tributary of the Huallaga, dept. of San Martin, ca. alt. 230 m., tree 6 m. tall, fl. white, Sept.-Oct., 1932, *Klug 2756* (TYPE, Arn. Arb.; isotype, Gray Herb.).

This species is related to *C. Sprucei* Mez, of the Rio Negro and the Guianas, from which it differs in having smoother, more elongate, less hairy leaves and a more loosely branched inflorescence. The leaves are not roughened above by slightly prominent repeatedly branched veinlets. The lower surface is much less hairy. The specimen was distributed as *C. Ulei* Johnston, from which, like *C. Sprucei*, it differs in having a very hairy ovary, finer pubescence on the lower leaf-surfaces, and more papery, more hairy, less regularly and sharply lobed calyces.

Cordia ripicola, sp. nov., arborescens 8–10 m. alta dichotome ramosa; ramulis sordidis pilis brevibus rigidulis scabridis; foliis subhomomorphis oblongis vel obovato-oblongis vel lanceolatis 8–14 cm. longis 3–7 cm. latis medio vel supra medium latioribus, apice acuminatis, basi acutis, supra sublucidis sparsissime breviterque strigosis, subtus minute rigideque hispidulis, nervis 6–8-jugis, nervis tertiaribus obscuris, petiolis 2–6 mm. longis; cymis gracilibus 3–10 cm. crassis laxe ramosis; calyce strigoso in alabastro obovato ca. 4 mm. longo 2–3 mm. crasso, intus supra medium strigoso, apice rotundo, ad anthesim in lobos 2–5 irregulares disrumpente; corolla alba 4–5 mm. longa, lobis ca. 2.5 mm. longis, filamentis ca. 3.5 mm. longis basim versus pilosis; ovario glabro vel summum ad apicem sparse pubescente; fructu ignoto.

PERU: Florida, Rio Putumayo, at mouth of Rio Zubineta, dept. Loreto, ca. 180 m. alt., "Chore-ey," forest along river, fl. white, tree 8–10 m. tall, May-June 1931, *Klug 2262* (TYPE, Arn. Arb.; isotype, Gray Herb.) and 2277 (AA, GH).

A species related to *C. Sprucei* Mez and *C. laevior* Johnston, from

which it differs in having scattered appressed hairs on the upper face and abundant minute appressed ones on the lower face of the smaller, more oblong leaves. The calyx is more papery in texture and opens more irregularly. The style and ovary are sparsely hairy. The character of the calyx, the appressed hairs on the leaves and the hairiness of the pistil readily separate it from *C. Ulei* Johnston, the species under which the type has been distributed. *Cordia Ulei* comes from southwestern Brazil, at ca. lat. 11°S. The proposed species was collected nearly under the Equator. ***Cordia ucayaliensis***, comb. nov. (*C. Ulei* var. *ucayaliensis* Johnston), readily distinguished by having the upper surface of the leaves strigose, comes from northeastern Peru.

Saccellium brasiliense, spec. nov., gracile; foliis lanceolatis 4–7.5 cm. longis 18–28 mm. latis medium versus latioribus, margine obscure sinuatis vel supra medium sparse denticulatis, supra viridibus pilos graciles rectos valde adpressos gerentibus, subtus pallidis distincte sericeis pilos abundantissimos minutos valde adpressos gerentibus, apice basique acutis, nervis 8–10-jugatis, petiolis 3–6 mm. longis strigosis; ramulis gracilibus laxe ramosis brunescens juvenate sordide pubescentibus mox glabrescentibus, lenticellis numerosis orbiculatis pallidis punctatis; ramulis fertilibus 3–5 cm. longis ca. 5-foliatis; inflorescentia terminali paniculata 2–6 cm. longa folia vix superante; calycibus strigosis, dentibus laxe recurvatis.

BRAZIL: Corumba, Matto Grosso, Dec. 23, 1902, *Malme 2759* (TYPE, Herb. Berol.); Corumba, Dec. 22, 1902, *Robert 804* (BM, BD).

The two collections cited are devoid of corollas and are in early fruiting condition only. A study of the immature calyx and ovary, however, leave no doubt as to the generic relations of this interesting plant. The species is evidently a relative of the Bolivian *S. Oliveri*, but is readily separable by its small silky-strigose leaves and generally more compact habit of growth. *Saccellium brasiliense* has been reported from Corumba, doubtfully as *S. lanceolatum*, by Moore, Jour. Bot. **45**: 405 (1907). Following I give the names of the known species of *Saccellium* and cite all the collections I have examined of these relatively rare species. The three known species may be separated as follows:

- Plant glabrous or practically so; leaves 3–5 cm. broad, broadest at or slightly above the middle *S. Oliverii* Britt.
 Plant evidently pubescent; leaves less than 3 cm. broad, broadest at or below the middle.
 Leaves broadest near the middle, beneath silky strigose, lustrous, blade 4–7.5 cm. long; fertile branches 3–5 cm. long, bearing about 5 leaves; old branches brown, with evident pale lenticels *S. brasiliense* n. sp.

Leaves broadest near base, beneath velvety or somewhat tomentose, dull, blade 5–12 cm. long; fertile branches 10–20 cm. long, bearing about 10 leaves; old branches gray or only rarely brown, without evident lenticels....

.....*S. lanceolatum* H. & B.

Saccellium Oliverii Britton ex Rusby, Bull. Torr. Bot. Cl. **26**: 147 (1899).

This species is known only from the type-collection made by Rusby, no. 2535, in May 1886 at 600 m. alt. at Guanai (or Huanay), Bolivia. The locality is in the department of La Paz at the confluence of the Rio Mapiri and Rio Tipuani at about lat. 15°30' S. and long. 68° W. in Amazonian Bolivia. Only fruiting specimens of the species are known. In its slender brownish branches, rather evident pale lenticels, and general leaf-outline, the species resembles *S. brasiliense* more than it does *S. lanceolatum*. The leaves are glabrous except for a few short inconspicuous ascending hairs along the midrib and principal veins. A similar scanty inconspicuous indument is also found in the inflorescence.

Saccellium lanceolatum Humboldt & Bonpland, Pl. Aequin. **1**: 47, tab. 13 (1806); Humboldt, Bonpland & Kunth, Nov. Gen. **7**: 209 (1825); Miers, Trans. Linn. Soc. London, Bot. **1**: 25, tab. 6 (1875).

In two widely separated areas, 1. Northern Peru in northern parts (prov. Jaen) of the Dept. Cajamarca, lat. 5°–6° S., in the Amazonian drainage; 2. mountains of southern Bolivia (prov. Chuquisaca and Tarija) southward along the mountains of northern Argentina to Tucuman, ca. lat. 27° S.

PERU: between Jaen and Bellavista, prov. Jaen, 600–700 m. alt., shrub or small tree, common, April 29, 1912, *Weberbauer 6209a* (BD); Valley of the Marañon between Bellavista and the mouth of the Rio Chinchipe, prov. Jaen, 500 m. alt., small tree 4 m. tall, flowers white; accrescent calyces yellow-green, May 1, 1912, *Weberbauer 6226* (G, BD); Valley of the Marañon at the mouth of the Rio Chinchipe, prov. Jaen, 400–500 m. alt., tree 6 m. tall, flowers white, accrescent calyces yellowish green, April 30, 1912, *Weberbauer 6217* (G, BD); near Rio Huancabamba, *Bonpland* (TYPE, Paris; fragments, DC, Lindl., Gray). BOLIVIA: between Atajado and Parapiti, 700 m. alt., small tree, Dec. 1910, *Herzog 1192* (BD); south of Rio Pilcomayo, prov. Tarija, Feb. 18, 1916, *Steinbach 1776* (BD); Bolivia, Pampas, evergreen tree 4.5–6 m. tall, woods, May 1864, *Pearce* (BM). ARGENTINA: Islota, Sierra Sta. Barbara, Jujuy, dry open place, tree 15–20 m. tall, July 5, 1901, *Fries 260* (Munich); Sierra Sta. Barbara, Salta, *Schuel 38* (G); Rio Blanco, dept. Oran, Salta, 650 m. alt., flowers yellowish, tree 10 m. tall, trunk 5 dm. thick, in high forest, Nov. 19, 1927, *Venturi 5546* (AA, G, K, BM); Abra Grande, dept. Oran, March 1927, 750 m. alt., tree 5 m. high, flowers yellowish, *Venturi 6780* (AA); Rio Piedras, dept. Oran, Nov. 15, 1911, *Rodriguez 85* (G); Campo Duran,

dept. Oran, a tree common on higher slopes, "Guayabil," Jan. 28, 1930, *Parodi 9269* (G); Tartagal, Salta, a tree, Feb. 1923, *Hauman* (G); hills near the crossing of the Rio Juramente, Salta, tree or shrub up to 6 m. tall, Feb. 21, 1873, *Hieronymus & Lorentz 295* (BD, Deles); Alemania, dept. Guachipas, Salta, 1100 m. alt., flowers white, tree 6 m. tall, in high forest, trunk 2 dm. thick, Dec. 22, 1929, *Venturi 10005* (G, K, BM); El Cadillal, dept. Burruyacu, Tucuman, Dec. 20, 1909, *Lillo 9823* (Deles); Tucuman, dept. Capital, alt. 450 m., tree 10 m. tall, flowers white, Dec. 12, 1907, *Lillo 7234* (G); Estate of Professor Lillo, dept. Capital, Tucuman, 460 m. alt., March 1925, *Venturi 3816* (AA); Tucuman, Dec. 12, 1907, *Stuckert 18375* (Deles); Tucuman, Feb. 10, 1910, *Lillo* (G).

The distinctly lanceolate leaves and the leafy, elongate stiffish branches readily characterize this species. The range of the tree is peculiar for it occurs in two far-separated regions in Peru and Argentina. Though this behavior suggests that two species or that a species and a variety is involved, a careful comparison of copious material has failed to produce any differences that would justify the proposal of even a new variety. The Peruvian plant differs from that of Argentina only in its perhaps somewhat sparser and slightly more slender pubescence on the herbage and in its somewhat darker stems.

In the *Plantae Aequinoctiales* 1: 47 (1806), the source of the original Humboldt & Bonpland collection of *Saccellium* is given as "ad rivos fluvii Guancabamba." Similar data are on the type-specimen at Paris. In the *Nova Genera*, 7: 208 (1825), the locality is given in more detail as follows: "inter Loxam et Tomependam Bracamorensium, ad ripas fluminis Guancabambae." The locality, Loja, of course, is in southern Ecuador. Tomependa is a ruined village near the junction of the Rio Chinchipe and the Rio Marañon. The Rio Huancabamba joins the Marañon about 50 km. above Tomependa. In all probability the type was collected in or near the province Jaen, in the region of northern Peru in which it has been collected by Weberbauer, *Bot. Jahrb.* 50: suppl. p. 92 (1914).

Coldenia conspicua, sp. nov., prostrata ut videtur annua; caulibus articulatis laxè ramosis 2–15 cm. longis, juventate dense graciliterque hispidulis et plus minusve glanduliferis; foliis aggregatis numerosis, lamina late lanceolata vel elliptica 5–13 mm. longa 2–5 mm. lata, subtus prominenter costata et nervosa (nervis 2–3-jugatis vix conspicuis) pilis gracilibus brevibus numerosis erectis asperata, supra pustulosa pilis robustioribus longioribus rigidioribus numerosis ascendentibus asperata, margine laxè revoluta integra vel obscurissime sparsissimeque crenata; petiolis gracilibus 2–9 mm. longis glanduliferis pilis abundantibus longis gracilibus erectis setosis; calyce 5-partito, lobis gracilibus basim versus

subinduratis et subnavicularibus praeterea linearibus hispidis glanduliferis ad anthesin ca. 9 mm. longis fructiferis ad 15 mm. longis; corolla conspicua coerulea, tubo ca. 9 mm. longo 2.5–3 mm. crasso lobis calycis subaequilongis intus glaberrimo, limbo 10–12 mm. lato patenti, lobis 4–5 mm. diametro, faucibus haud appendiculatis, filamentis 4–5 mm. longis glabris apicem versus tubi affixis ca. 2 mm. longe extrusis, antheris oblongis medio-affixis 1–1.4 mm. longis; stylo filiformi glabro 15 mm. longo 2 mm. profunde bilobato, stigmatibus 2 minutis obscure bilobulatis; nuculis 4 globosis 1.5–2 mm. diametro dense minuteque tessellato-tuberculatis per carunculas 1 mm. longas et crassas in apice receptaculi basaliter affixis; receptaculo ad anthesin cylindrico, fructifero turbinato.

PERU: sand flat near Mejia, Dept. Arequipa, 40 m. alt., flowers blue, Oct. 26, 1923, *Guenther & Buchtien 155* (TYPE, Inst. Bot. Hamburg); Mejia, July 21, 1923, *Guenther & Buchtien 156* (Hamburg); Mollendo, Dept. Arequipa, *Miss D. Stafford K60* (Kew).

A very distinct and remarkable species belonging to the Chilean and southern Peruvian section *Sphaerocarya*, Johnston, *Contr. Gray Herb. 70: 57* (1924). The nutlets of the new species are quite similar to those of this section in size, shape and markings. From the previously described species of the section, however, *C. conspicua* differs in its extremely large corollas, its protruding stamens and its remarkable nutlet-attachment. The corollas are at least twice the size of those of any other species of *Coldenia*. The nutlet-attachment is also unique in the genus. In the known species of the section *Sphaerocarya* the immature nutlets are attached laterally at the middle of the sides of an erect subcylindrical gynobase. This is distorted somewhat by the crowding of the growing nutlets and tends to become constricted medially. After the nutlets have fallen away it is consequently more or less spool-shaped. In the proposed species the immature nutlets are borne laterally, not about the middle, but about the summit of the subcylindrical gynobase. By growth and the consequent pressure of crowding, the nutlets at maturity come to be attached basally in the expanded summit of the now turbinate gynobase. What is most peculiar is that each nutlet has a well developed strophiolate basal plug which is immersed in the gynobasal tissue. At maturity the strophioles loosen from the gynobase and with their attached nutlets fall away leaving 4 deep more or less united sockets in the much broadened apex of the gynobase. The mature gynobase, hence, becomes more or less cupulate.

The species is known only from along the coast in southern Peru in the general region of the port of Mollendo. The type has been reported, *Bruns, Mitt. Inst. Allgem. Bot. Hamburg 8: 67* (1929), as *C. dicho-*

toma, but that species, of course, has small corollas and utterly different fruit-structures. The other species of the section *Sphaerocarya* are poorly understood. Since publishing, l. c., on the South American species of *Coldenia* I have seen the types of Philippi's species. I have been unable to separate his *C. litoralis*, *C. atacamensis* and *C. parviflora*, though from geographic considerations one would expect that the plant from the coastal region (*C. litoralis*) would be distinct from that of the high Puno de Atacama (*C. atacamensis* and *C. parviflora*). The type of *C. parviflora* is quite distinct from the Peruvian plants of the Arequipa region, which I cited under that name in my synopsis of the South American species of *Coldenia*. The correct name for this species is *C. elongata* Rusby! Its elongate leaf-blades, woolly petioles and calyces, and usually evidently crenate leaf-margins serve to distinguish it from Philippi's species. *Coldenia elongata* is known only from middle altitudes east of the coastal deserts of southern Peru and northern-most Chile. In Peru only two species of the section *Sphaerocarya* are known. These are *C. conspicua* which grows along the coast and *C. elongata* which grows along the cordilleras in the interior.

Coldenia Nuttallii Hooker, Kew Jour. Bot. **3**: 296 (1851); Johnston, Contr. Gray Herb. **75**: 43 (1925). *Coldenia decumbens* Hauman, Apuntes Hist. Nat. Buenos Aires **1**: 55 (1909) and Anal. Soc. Cient. Argentina **86**: 301 (1918).

This species so wide-spread in the intermontane area of the western United States has been known only from two small areas in the high cordilleras of Argentina, in northwestern San Juan, Johnston, Physis **9**: 316 (1929), and in the Uspallata Pass region in Mendoza, Hauman, l. c. The plant was collected around 3000 m. alt. in San Juan and about 2300 m. alt. in Mendoza. A third locality for the species in South America, one much further south and so, not surprisingly, at lower altitudes, may now be put on record. I have seen a collection of *C. Nuttallii* in the herbarium at Munich which was obtained by Erik Ammann (no. 5) in Oct.-Nov. 1927, at 700 m. alt. near Cobunco, Neuquen, Argentina.

Tournefortia brasiliensis Poiret, Encyc. **5**: 357 (1804); Johnston, Contr. Gray Herb. **92**: 89 (1930).

I have studied the type of this doubtful species in the Lamarck Herbarium at Paris. It represents a specimen of *Vernonia scorpioides* (Lam.) Pers., with the flowers just beginning to develop. It is remarkably like, and probably a part of the collections by Commerson made at Rio Janeiro ("de l'île aux chats") in July, 1767. Consequently it may be a part of the same material as the type of *Conyza scorpioides* Lamarck, Encyc. **2**: 88 (1790).

Heliotropium transalpinum Vellozo, Fl. Flum. 68 (1825) and Icones, 2: tab. 40 (1827). *Heliotropium tiaridioides* var. *schizocarpum* Johnston, Contr. Gray Herb. 81: 7 (1928), where other synonyms are cited.

Vellozo in describing and illustrating his species gave no indication as to whether the carpels were dorsally sulcate or not. Suspecting that the carpels were sulcate, however, since only plants with such developments were known about Rio Janeiro, I provisionally cited the name *H. transalpinum* among the synonyms of my *H. tiaridioides* var. *schizocarpum*. Vellozo's name, unhappily, is several years older than *H. tiaridioides* Cham., the species I then accepted. Subsequent study and consideration of much South American material of *Heliotropium*, not available when my monograph was written, has left no reasonable doubt as to the identity of the plant described and illustrated by Vellozo. The scores of specimens examined from São Paulo, Rio Janeiro, Minas Geraes and northward in Brazil, uniformly have sulcate nutlets, and there seems every reason for believing that Vellozo's plant had them also. I am accordingly taking up *H. transalpinum* as the correct appellation for the plant formerly treated by me as *H. tiaridioides* var. *schizocarpum*. The southern plant with non-sulcate nutlets, which I treated as *H. tiaridioides* var. *genuina* must have the new name I am publishing below. The type of *H. transalpinum* was collected in the state of Rio Janeiro near Boa Vista, ca. 9 km. up the Rio Parahyba from the town of Parahyba do Sul and beyond the coastal mountains (whence the specific name) from the city of Rio Janeiro.

Heliotropium transandinum var. **tiaridioides** (Cham.) comb. nov. *Heliotropium tiaridioides* Chamisso, Linnaea 4: 453 (1829). *Heliotropium tiaridioides* var. *genuina* Johnston, Contr. Gray Herb. 81: 6 (1928), where other synonyms are cited.

Heliotropium angiospermum Murray, Prodr. Stirp. Göttingen 217 (1770); Johnston, Contr. Gray Herb. 81: 10 (1928). *Heliotropium humile* Lamarck, Tab. Encyc. 1: 393 (1791).

In my treatment of the South American species of *Heliotropium*, Contr. Gray Herb. 81: 66 (1928), I cited *H. humile* Lam. as a doubtful synonym of *H. fruticosum* L. This I now find is incorrect. In the Lamarck Herbarium at Paris there is only one specimen determined by Lamarck as *H. humile*, this bears a label in his script reading: "heliotr. humile lam. illustr." The specimen is small but represents good *H. angiospermum*. The original description of Lamarck's species reads: "1757 HELIOTROPIUM **humile**. H. foliis ovato-lanceolatis villosis;

spicis solitariis lateralibus. Ex ins. Carib. Annum. *H. Dict. no. 6 Quoad descr.*" The reference is apparently to Lamarck's earlier account of *Heliotropium* in vol. 3 of the *Encyclopédie*, pp. 92–95 (1789), but no mention of *H. humile* is to be found there. Species no. 6 in the work is *H. fruticosum*, described as having linear-lanceolate leaves. Poiret, *Encyc. Suppl.* 3: 25 (1813), was evidently puzzled by Lamarck's description of *H. humile*. He mentions that species under *H. ternatum* but suggests that it might be *H. fruticosum*. I am content, however, to place *H. humile* among the synonyms of *H. angiospermum*, for the named specimen in Lamarck's herbarium seems authentic and agrees with the few words in the original description.

Lasiarrhenum pinetorum, sp. nov., herba; caulibus erectis simplicibus 10–15 cm. altis gracilibus strigosis foliosis; foliis lineari-subulatis 1–3 cm. longis 1–1.5 mm. latis sessilibus medio-costatis sed vix nervatis apicem versus caulis gradatim reductis margine valde revolutis supra sparse strigosis; floribus cymas terminalis 3–7-floris lineari-bracteatas aggregatis; pedicellis 2–3 mm. longis strictis strigosis; calycibus 5-lobatis ca. 4 mm. longis, lobis lineari-lanceolatis strigosis; corolla flava ca. 10 mm. longa extus strigosa, tubo ca. 4 mm. longo ca. 1.5 mm. crasso in fauces 3.5–4 mm. longas ca. 3 mm. crassas abrupte transmutato intus glaberrimo, lobis erectis oblongis 2.5 mm. longis 2 mm. latis apice rotundis; antheris glaberrimis 2 mm. longis oblongis basi sagittatis erectis (vix versatilibus) sub medium affixis; filamentis 4 mm. supra basim corollae affixis inclusis 1–1.3 mm. longis late alatis (in ambitu obovatis) apicem versus ca. 0.7 mm. latis; stylo 12 mm. longo filiformi longe (ca. 5 mm.) exsertis; fructu ignoto.

MEXICO: growing in the mountains in pine-forest, very rare, September, *Ghiesbreght 311* (TYPE, Paris).

This is a remarkable species which is placed in *Lasiarrhenum* chiefly because of its broadly winged filaments. From *L. strigosum*, formerly the only known member of its genus, it differs in its very small size, its uninerved leaves, its glabrous anthers and its precociously long-exserted style. The rounded corolla-lobes and the expanded filaments separate *L. pinetorum* from the genus *Onosmodium*, while the long-exserted style, the erect corolla-lobes, the obovate filament and the sagittate anthers distinguish it from *Lithospermum*. No locality is given for this interesting plant. Ghiesbreght, however, collected chiefly in southern Mexico and mostly in the state of Oaxaca.

Lithospermum Muelleri, sp. nov., perenne; caulibus erectis gracilibus foliosis simplicibus vel rariter stricte et simpliciter longeque ramosis

2–5 dm. altis e radice crasso dense multicepitate rumpentibus strigosis vel basim versus breviter hispidis; foliis strictis firmis costatis sed vix nervatis vel rarissime perinconspicue sparseque nervatis, inferioribus oblongo-ellipticis, aliter lanceolatis, sessilibus, apicem versus caulis gradatim reductis 1–4 cm. longis 3–8 mm. latis, apice acutis, supra minute strigosis et pustulatis, subtus in margine et costa strigosis sed ceterum glabris; inflorescentia bracteata scorpioidea terminali solitari vel geminata vel ternata 3–10 cm. longa; calyce ad anthesin ca. 6 mm. longo, lobis inaequalibus cuneatis, pedicellis 1–3 mm. longis strigosis; corolla subcylindrica 15–19 mm. longa ca. 3 mm. crasso ut videtur flavescens intus glaberrima extus adpresse pubescente, lobis minutis ascendentibus suborbicularibus ca. 1 mm. diametro, faucibus inconspicue plicato-appendiculatis saepe plus minusve constrictis; staminibus 2 mm. sub apice tubi corollae affixis, filamentis ca. 1 mm. longis, antheris oblongis ca. 2 mm. longis inclusis; stylo filiformi ad anthesin 1–3 mm. longe extrusis; fructu ignoto.

MEXICO: common in pine belt above Mesa de la Camisa on the north slope of Sierra Tronconal between Cañon de los Charcos and Cañon de San Miguel, Sierra Madre Oriental, ca. 25 km. s. w. of Galeana, Nuevo Leon, 1800–2700 m. alt., June 4, 1934, C. H. & M. T. Mueller 739 (TYPE, Gray Herb.).

A very distinct species of uncertain affinities. Its subtubular corolla, frequently with a narrowly constricted ring about the throat, and its extremely small round ascending lobes, separate it from *L. strictum*, the only species I am inclined to believe which possibly may be a close relative of it.

Macromeria leontis, sp. nov., perennis erecta ca. 5 dm. alta e radice crasso profunde oriens; caulibus subsimplicibus pilis brevibus gracilibus erectis vel subretrorsis dense vestitis; foliis lanceolatis medium versus caulis grandioribus 4–10 cm. longis 1–2 cm. latis utroque acutis sessilibus evidenter nervatis, subtus pilis gracilibus brevibus erectis abundantibus vestitis vix pustulatis, supra viridis pustulatis et breviter hispidis; inflorescentia terminali evidenter bracteata; calyce 1.5–2 cm. longo, lobis linearibus, pedicello 1–5 mm. longo; corolla 5–7 cm. longo intus glaberrimo extus breviter pubescenti, tubo 2–3 cm. longo 1.5–2 mm. crasso supra in fauces 2 cm. longos 7–8 mm. latos gradatim ampliatis, lobis triangularibus ca. 9 mm. longis et 6 mm. latis non rariter plus minusve recurvatis; antheris elongatis ca. 3.5 mm. longis; filamentis ca. 4 mm. infra apicem faucium corollae affixis 10–15 mm. longe exsertis; stylo filiformi tarde exsertis; fructu ignoto.

MEXICO: scattered in dense oak-woods on the ascent into Taray, Sierra

Madre Oriental, ca. 25 km. s. w. of Galeana, Nuevo Leon, ca. 2400 m. alt., June 5, 1934, *C. H. & M. T. Mueller 754* (TYPE, Gray Herb.); scattered in dense pine and oak woods along the descent into Alamar, Sierra Madre Oriental, May 29, 1934, *C. H. & M. T. Mueller 594* (G).

Probably a relative of *M. Pringlei*, but differing in having a fine slender spreading indument throughout. In *M. Pringlei* the more rigid, somewhat longer sparser hairs are closely appressed and the upper leaf-surfaces are a much clearer green than in *M. leontis*. The latter species has leaves noticeably grayer and duller in color.

Macromeria barbigera, sp. nov., perennis, setosa, robusta; caulibus erectis 5–8 dm. altis saepe simplicibus; foliis lanceolatis vel ovatis evidenter nervatis, inferioribus parvis vix persistentibus, ceteris latioribus 3–5 cm. latis 5–11 cm. longis subsessilibus basi plus minusve rotundis, superioribus elongatioribus et minoribus; floribus terminalibus in cymas racemosas bracteatas aggregatis; bracteis foliaceis 2–7 cm. longis 1–4 cm. latis; pedicellis ca. 5 mm. longis; calyce ad anthesin ca. 18 mm. longo, lobis inaequalibus subulato-linearibus erectis; corolla ut videtur flavescenti intus glaberrima 5–6 cm. longa recta vel plus minusve curvata, tubo 1.5–2 cm. longo 1.5–2 mm. crasso lobis calycis paullo longiore, faucibus e tubo abrupte ampliatis ca. 2 cm. longis 5–6 mm. crassis cylindraceis in alabastro paullo asymmetricis, limbo abrupte dilatato 12–15 mm. diametro, lobis 5–6 mm. longis acutis ascendentibus apicem versus recurvatis; filamentis in faucibus ca. 8 mm. infra sinibus loborum affixis inaequalibus 12–15 mm. longis glabris filiformibus exsertis; antheris oblongis medio-affixis; stylo filiformi breviter tardeque extruso; stigmati minimo bilobulato; fructu ignoto.

MEXICO: common in dense oak wood beyond the pine and fir belt, north slope of Sierra Tronconal between Cañon de San Miguel and Cañon de los Charcos, 1800–2700 m. alt., Sierra Madre Oriental about 25 km. s. w. of Galeana, Nuevo Leon, June 4, 1934, *C. H. & M. T. Mueller 741* (TYPE, Gray Herb.).

Related to *M. Thurberi* but quickly separable by its more robust habit, larger broader leaves and very different pubescence. The foliage of *M. Thurberi* is copiously and finely strigose with an admixture of coarse more or less spreading hairs. In the proposed species the strigosity is lacking and the spreading hairs much longer and very conspicuous. The corollas of *M. Thurberi* have a much more abundant and paler indument than do those of *M. barbiger*a. The range of the new species is to the southeast of the most easterly station of its relative.

Evidently to be identified with *M. barbiger*a are collections made by Mueller in 1933. These specimens have been kindly sent to me from

the Field Museum by Mr. P. C. Standley. One of these collections, no. 174 from the "Trail to Puerto," Nuevo Leon, has leaves becoming 17 cm. long and 7 cm. broad. Its flowers are immature. The second collection, no. 173 from Diente Canyon, 21 km. south of Monterey, is evidently from a very mature plant and consists of the elongated inflorescence showing mature bracts and the old pedicels and calyces.

Among his collections of 1934 Mueller obtained one which may also represent a form of *M. barbiger*. This specimen, no. 830, was collected on Sierra Infernillo, about 25 km. s. e. of Galeana, Nuevo Leon, where it was common over small areas just below the crest, 2700–3000 m. alt. In leaf-outline and in general habit the plant suggests *M. Thurberi*, but differs in its lack of strigosity and in its very much less hairy flowers. The corollas differ from those of *M. barbiger*. They are somewhat smaller. The tube is gradually expanded towards the lobes and not abruptly expanded into a well developed cylindrical throat as I have indicated in my formal description above. In addition the corolla is slightly less hairy and the lobes not so acute. The plant is evidently related to *M. barbiger* and chiefly because of geographical considerations I am tentatively, at least, referring it to that species as a possible ecological form.

Havilandia opaca, sp. nov., procumbens; caulibus foliosis abundanter ascendenterque ramosis 1–1.5 mm. crassis in nodis radículas graciles gerentibus pilis brevibus rigidis appressis dense vestitis, internodiis 3–10 mm. longis; foliis firmis subcoriaceis costatis sed enervatis numerosis, apice rotundis vel obtusis, supra glaberrimis sparsissime pustulatis in costa sulcatis, subtus supra medium pustulatis in costa prominente strigosis ceteris glabris vel sparsissime strigosis, margine strigoso-ciliatis vel basim versus sparse ciliatis; foliis ramorum fertiliū ellipticis 4–10 mm. longis 3–5 mm. latis, basi rotundis et oblique 1–2 mm. lateque sessilibus; foliis ramorum steriliū plus minusve oblanceolatis 8–12 mm. longis paullo sub apicem basim versus in petiolum 1 mm. latum ca. 2 mm. longum gradatim attenuatis; floribus solitariis numerosis axillaribus; corolla alba 4 mm. diametro, tubo ca. 1.2 mm. longo 1 mm. crasso intus glaberrimo, limbo patenti, lobis suborbicularibus ca. 1.5 mm. diametro, appendiculis faucium 5 intrusis trapeziformibus; antheris oblongis inclusis ca. 0.4 mm. longis, filamentis perbrevibus paullo supra medium tubi affixis; calyci ad anthesin 2 mm. longo, lobis 5 ciliatis latis, pedicello 0.5–1 mm. longo; nuculis 4 erectis angulate ovoideis 1 mm. longis opacis dense minutissimeque papillatis, dorso convexis, ventre angulatis, imam ad basim anguli ventralis ad gynobasim planum affixis.

BRITISH NEW GUINEA: common in open grassland, Murray Pass, Wharton Range, 2840 m. alt., prostrate herb forming masses 3 dm. broad or more, flowers white, June 12, 1933, *Brass* 4178 (TYPE, Gray Herb.; ISOTYPE, NY).

A species evidently related to *H. papuana* Hemsl., from which it differs in its stout somewhat ovate, gray, dull, minutely papillate, rather than elongate, somewhat lance-lunate, black, lustrous, smooth nutlets. The margins of the leaves in *H. papuana* are evidently ciliate. In *H. opaca* the marginal hairs of the leaves, similar in size, number and position, are not spreading, but antrorsely appressed along the leaf-margin. The habit of growth in *H. papuana* is quite similar to that of *H. opaca*.

Havilandia robusta, sp. nov., procumbens; caulibus elongatis sparse ramosis; foliis coriaceis oblanceolatis 2–4.5 cm. longis 5–9 mm. latis paullo sub apicem basim versus in petiolum vaginatum gradatim attenuatis, apice rotundis vel subemarginatis, margine sparsissime strigosis, supra sparse strigosis, subtus glaberrimis vix nervosis, costa prominente sparsissime strigosa; floribus axillaribus; calycibus ad anthesin ca. 4 mm. longis, lobis lanceolatis margine sparsissime strigosis, pedicellis 5–7 mm. longis; calycibus maturitate ca. 6 mm. longis pedicellis 8–12 mm. longis; corolla 8–10 mm. diametro; nuculis 4 angulato-ovoideis opacis ca. 2 mm. longis dense minutissimeque papillatis, dorse convexis, ventre angulatis.

BRITISH NEW GUINEA: common about forest borders, Mt. Albert Edward, 3680 m. alt., June 1933, *Brass* 5681 (TYPE, N. Y. Bot. Gard.).

Evidently related to *H. opaca*, also of southeastern New Guinea, from which it differs only in being much larger in all its parts, and in having well developed pedicels and more elongate leaves. The upper surface of the leaves is lustrous and distinctly strigose.

Havilandia papuana Hemsley, *Kew Bull.* 1899: 107 (1899).

BRITISH NEW GUINEA: thickly massed on shallow soil over rock in grasslands, Mt. Albert Edward, 3680 m. alt., flowers white with yellow throat, June 18, 1933, *Brass* 4245 (G, NY).

This species was briefly, though adequately described by Hemsley from material obtained on Mt. Scratchley, 3660 m. alt., and in the Wharton Range, 3330 m. alt. It is known only from the high mountains of eastern British New Guinea.

The genus *Havilandia* is confined to high altitudes and consists of the three above enumerated species from British New Guinea, and *H. borneensis* Stapf from Mt. Kinabalu in British North Borneo. It is possible, in addition, that *Lithospermum minutum* Wernh., described from the Mt. Carstensz region in Dutch New Guinea, may also belong

to *Havilandia*. Unfortunately the type and only known collection of this puzzling species is so scanty and inadequate that it must remain an obscure, troublesome element in the flora of New Guinea until someone recollects it. The type consists of two minuscule snips in flower only, a ridiculously inadequate basis for the proposal of any species of Boraginaceae and certainly for one whose acquaintance with the genera of that family may be judged by his selection of the genus under which he essayed to publish the imperfect specimen from Dutch New Guinea.

Plagiobothrys Scouleri (H. & A.) Johnston, Contr. Gray Herb. 68: 75 (1923) and Contr. Arnold Arb. 3: 51 (1932). *Myosotis Scouleri* Hooker & Arnott, Bot. Beechey Voy. 370 (1840). *Allocarya media* Piper, Contr. U. S. Nat. Herb. 22: 107 (1920). *Plagiobothrys medius* (Piper) Johnston, Contr. Arnold Arb. 3: 58 (1932). *Allocarya divaricata* Piper, Contr. U. S. Nat. Herb. 22: 107 (1920).

The original and only mention of *Myosotis Scouleri* in the writings of Hooker & Arnott appears in the Botany of Capt. Beechey's Voyage in a note on a collection of *Plagiobothrys Chorisianus* from California. The note is as follows: "The flowers here are on pretty long pedicels, while the Columbia plant has them shortly pedicellate; the latter presents, besides, a different aspect, and may be called *M. Scouleri*; it appears very closely allied to *M. californica*, Fisch. et Meyer, but the corolla is longer than the calyx." Gray, who apparently never studied the type of *M. Scouleri*, applied the name to an erect-growing plant with geminate spikes of conspicuous corollas, which is widely distributed in western Oregon and Washington, and all subsequent writers have followed him in that identification. A study of the type, however, shows this usage to be quite incorrect.

The specimens evidently the type of *M. Scouleri* are to be found on a mixed sheet, formerly in the Hooker Herbarium, now at Kew. This sheet bears three different collections: (1) the specimen of *P. Chorisianus* mentioned in the Botany of Beechey's Voyage, (2) specimens of *P. scopulorum* (?) or *P. cognatus* (?) collected by Nuttall, and (3) three plants labeled: "N. W. Coast, Dr. Scouler." The latter evidently constitute the type of *Myosotis Scouleri* H. & A. Duplicates of this Scouler collection are to be found on a sheet from Bentham's herbarium, at Kew, labeled: "Am. bor. occ. Scouleri, 1828," and in the herbarium at Edinburgh labeled: "Columbia, Scouler, 1827, (932)." These collections appear to represent a form of the plant I have treated in my monograph as *Plagiobothrys medius* (Piper) Johnston. They have the rufous calyx-lobes, evident corollas, and the general habit of that species.

Scouler is known to have collected about the mouth of the Columbia and at many small ports along the coast of Washington and Vancouver Island. *Plagiobothrys medius* is the common species near the coast in northwestern Washington and on Vancouver Island, and there is every reason that Scouler should have encountered it. Though the nutlets of Scouler's collection show certain peculiarities not matched in the available material of *P. medius*, I believe that they can be accommodated in that concept. The nutlets of the type of *M. Scouleri* have the rather bony pericarp common in *P. medius*, but the ridge attending the lateral scar is very closely appressed to the latter and encloses an areole (entirely filled by the scar) scarcely, if at all, broader than long. The nutlets of *P. medius* are, however, very variable and I believe the nutlet-variations of *M. Scouleri* can be admitted without destroying the naturalness of the concept.

Plagiobothrys hirtus (Greene), comb. nov. *Allocarya hirta* Greene, Pittonia 1: 161 (1888). *Allocarya Scouleri* var. *hirta* (Greene) Nelson & Macbride, Bot. Gaz. 61: 36 (1916). *Plagiobothrys Scouleri* var. *hirtus* (Greene) Johnston, Contr. Arnold Arb. 3: 52 (1932). *Allocarya calycosa* Piper, Contr. U. S. Nat. Herb. 22: 101 (1920).

I have indicated above that the type of *Myosotis Scouleri* H. & A. has been misinterpreted. The earliest correct name for the plant that has been called *Krynitzkia*, *Allocarya* and *Plagiobothrys Scouleri* is *Allocarya hirta* Greene. It is, however, strictly applied only to a local plant of the Umpqua Valley, Oregon, which has evidently spreading rather than appressed pubescence. The common form of this species must bear the following name:

Plagiobothrys hirtus var. **figuratus** (Piper), comb. nov. *Allocarya figurata* Piper, Contr. U. S. Nat. Herb. 22: 101 (1920).

This strigose form ranging from Oregon to Vancouver Islands is common.

Plagiobothrys hirtus var. **corallicarpus** (Piper), comb. nov. *Allocarya corallicarpa* Piper, Proc. Biol. Soc. Wash. 37: 93 (1924). *Plagiobothrys Scouleri* var. *corallicarpus* (Piper) Johnston, Contr. Arnold Arb. 3: 52 (1932).

A local form of southern Oregon characterized by its deeply alveolate nutlets.

Plagiobothrys calandrinoides (Phil.) Johnston, Contr. Gray Herb. 78: 91 (1927). *Allocarya alternifolia* Brand in Fedde, Repert. 26: 169 (1929).

The type of Brand's species has been examined. The lowermost leaves are weathered and crowded and so account for the very misleading specific name. The plant is the common Patagonian *P. calandrinoides*.

Thaumatocaryon dasyanthum var. **Sellowianum** (Cham.), comb. nov. *Anchusa Sellowiana* Chamisso, *Linnaea* 8: 115 (1833). *Moritzia Sellowiana* (Cham.) Fresenius in Martius, *Fl. Bras.* 8¹: 63 (1857). *Thaumatocaryon Sellowianum* (Cham.) Johnston, *Contr. Gray Herb.* 70: 13 (1924) and 78: 16 (1927). *Moritzia dasyantha* var. *Sellowiana* (Cham.) Brand in Fedde, *Repert.* 27: 148 (1929).

This plant differs from typical *T. dasyantha* only in its smaller corollas and appressed pubescence. Difficulty with connecting forms has convinced me that Brand might best be followed in treating *Sellowianum* as a mere variety. A collection of this variety from the state of Rio Janeiro, by Glaziou (no. 8731), supplies the basis for Glaziou's astonishing report of *Cyphomattia lanata* in Brazil, *Bull. Soc. Bot. France* 57: Mém. 3: 480 (1910). I have examined the specimen at Paris so determined by Glaziou.

Hackelia patens (Nutt.), comb. nov. *Rochelia patens* Nuttall, *Jour. Acad. Phila.* 7: 44 (1834). *Lappula coerulescens* Rydberg, *Mem. N. Y. Bot. Gard.* 1: 328 (1900). *Lappula subdecumbens coerulescens* (Rydb.) Garrett, *Fl. Wasatch Reg.* 78 (1911). *Hackelia diffusa* var. *caerulescens* (Rydb.) Johnston, *Contr. Gray Herb.* 68: 48 (1923). *Hackelia caerulescens* (Rydb.) Brand, *Pflanzenr.* [Heft 97] IV. 252²: 130 (1931). *Hackelia Nelsonii* Brand in Fedde, *Repert.* 26: 170 (1929). *Lappula decumbens* Nels. ex Brand, *Pflanzenr.* [Heft 97] IV. 252²: 126 (1931), lapsus calami.

I have examined Nuttall's type of *Rochelia patens* at the British Museum. The specimen was collected "near the Flat-Head River" on June 8, 1833, by N. B. Wyeth. The specimen is a good one and is evidently conspecific with *Lappula coerulescens*, a species also based upon material from western Montana. The species is known from western Montana and Wyoming and westward into Idaho, northern Utah and northern Nevada.

Hackelia grisea (Woot. & Standl.), comb. nov. *Lappula grisea* Wootton & Standley, *Contr. U. S. Nat. Herb.* 16: 164 (1913).

A readily recognizable species of New Mexico and adjacent Texas. Its relatively small corollas, with ascending lobes, quickly distinguish it among the west American annual and biennial species of this genus.

Lappula echinata Gilibert, *Fl. Lituanica*, 1: 25 (1781). *Cryp-*

tantha Lappula Brand in Fedde, Repert. **24**: 56 (1928) and Pflanzenr. [Heft 97] IV. **252**²: 147 (1931).

In the Pflanzenreich Brand placed his *Cryptantha Lappula* among the synonyms of *Lappula Redowskii* (Hornem.) Greene. I believe, however, that the species belongs under *L. echinata* Gilib. The evident corollas and the gross aspect of the type are of that species. A microscopic study of the (immature) nutlets of *C. Lappula* seems to show a double row of lateral prickles. Finally the type is given as from Concepcion, Chile, a locality at which *L. Redowskii* is certainly not to be expected to grow naturally, though a busy port at which an aggressive weed, such as *L. echinata*, might be introduced without any cause for surprise.

Lappula echinata is generally accepted as introduced into North America. This seems probable, though it is to be noted that the plant was collected in the New World at a very early date. A specimen in the DuBois collection at Oxford is labeled "brot from Maryland by Mr. Wm. Vernon, 1698." Among Michaux's collections at Paris there is one of this species labeled as "Dans ville de Montreal, 1792." The Smith collections in London contain a specimen labeled: "North America, 1817, F. Booth." In the British Museum there is a collection made by Douglas, during 1826, "In the valleys of the Rocky Mts.," most likely in northeastern Washington. It seems to have been again collected in the latter region only within the past ten years, though it has been well known in the southern parts of western Canada for at least a generation. There are reasons to believe that the railroads may have much aided in the distribution north of the International Boundary. The plant has exhibited an evident, progressive increase and migration westward across the more northern of the western United States. It is now rapidly increasing in eastern Washington where it gives every evidence of being a recent immigrant.

Cryptantha circumscissa (H. & A.) Johnston, Contr. Gray Herb. **68**: 55 (1923).

A few years ago, l. c. **81**: 75 (1928), I reported this characteristic plant of western United States from near Zapala, Neuquen, Argentina. A second station in Neuquen may now be recorded. At Munich I have seen specimens labeled as collected by Erik Ammann (no. 7) at Cerro Mesa between Sept. and Nov. 1927. The new station is nearly 90 km. southeast of Zapala.

Cryptantha clandestina (Trev.), comb. nov. *Lithospermum clandestinum* Treviranus, Del. sem. a 1832 in hort. Bonnensi collect. p. 2 (1832-3). *Cryptantha glomerata* Lehmann, Del. Sem. Hamb. **1832**: 4 (1832), nomen nudum; Fischer & Meyer, Ind. Sem. Hort. Petrop. **2**: 8

and 35 (1836); Johnston, Contr. Gray Herb. 78: 58 (1927). *Cryptantha microcarpa* Fischer & Meyer, Ind. Sem. Hort. Petrop. 2: 8 and 35 (1836).

A study of the original description of *Lithospermum clandestinum*, and of old garden material representing it, has made it clear that it is that well known cleistogamic species of Chile, the two forms of which have passed as *Cryptantha glomerata* and *C. microcarpa*. Fischer & Meyer, when describing *C. microcarpa*, in fact, actually cited *L. clandestinum* as a synonym. In the Bonn seed-list for 1832, published in Dec. 1832 or Jan. 1833, the name *Lithospermum clandestinum* appears in the alphabetic list on the second of the pages of that quarto catalogue. A reference leads to a footnote which reads as follows: "Diffusum hispidum; fol. lanceolatis amplexicaulibus; calycibus subsessilibus ventricosis corollam excedentibus; seminn. granulatis. Annum. Corolla alba, tubo ventricoso, limbo conniventi. Semina duo plerumque abortiunt. T[reviranus]." The name, *L. clandestinum*, appears again in the Bonn list for 1833, but not in those for 1834 or 1835.

Cryptantha glomerata Lehm. is the type-species of *Cryptantha*. Recently I had the privilege of consulting the extensive collections of old seed-catalogues at Berlin and Geneva. I now find it possible to record several important references in the history of that genus and species which were either unknown or unavailable to me at the time of my work on the group. The first mention of *Cryptantha glomerata* Lehm. and of the generic name appears in Lehmann's seed-list of the Hamburg Garden for the year 1832. The binomial appears as a mere name on page 4, thus: "*Cryptantha glomerata* Lehm." No description or explanation of the name is given! The list is dated 1832 and was probably published, as was customary with such lists, around the close of the year. No mention of the binomial is found in the Hamburg lists for 1830, 1831 or for 1833 or 1834. In 1835, p. 4, again without description, appears: "*Cryptantha glomerata* Lehm. (Del. Sem. 1832)." In 1836, p. 4, the following two names appear bare of description: "*Cryptantha glomerata* Lehm." and "*Cryptantha microcarpa* F. & M." These are repeated in the list for 1837, p. 4. In the list for 1838, p. 4, there is merely the name, "*Cryptantha microcarpa* F. & M." Fischer & Meyer, in their St. Petersburg seed-list for 1835, supplied the first descriptions of *Cryptantha glomerata* Lehm. and *C. microcarpa* F. & M. This Russian list bears a censor's date, Dec. 25, 1835, the equivalent of Jan. 5, 1836 of our present calendar. There is no mention of *Cryptantha* in the St. Petersburg list for 1834! Fischer & Meyer, when publishing and describing "*C. glomerata* Lehm." in their list for 1835, attribute the

name to "Bernhardi in litt." A study of Bernhardi's seed-lists, Sel. sem. hort. Erfurt., shows that the name "*C. glomerata* Lehm." appears as a mere binomial in those for 1833 (Jan. 18, 1834), 1834 (Feb. 24, 1835) and 1835. There is no mention of *Cryptantha* in the Erfurt list for 1832!

From the facts I have given it becomes evident that *Cryptantha glomerata* was in cultivation at Bonn and Hamburg in 1832. Treviranus immediately described the Bonn cultures as *Lithospermum clandestinum*. Lehmann applied to his Hamburg cultures the name *Cryptantha glomerata*, but did not describe it, that being done for him three years later by Fischer & Meyer who based their description on plants grown at St. Petersburg. There is no information as to the channels by which the species was introduced into cultivation. I suspect, however, that the original seed may have been obtained by Bertero, who collected the plant near the Rio Quillota, Chile, as early as 1828, and that seeds from this source may have been distributed from Turin.

Amsinckia intermedia Fischer & Meyer, Ind. Sem. Hort. Petrop. 2: 2 and 26 (1836).

This name appears bare in the alphabetic list on page 2 of the seed-list cited above. On page 26 (p. 1 of reprint) the following description is found, "A. INTERMEDIA. A. corolla fauce glabra nuda, limbo tubo subbreuiore; staminibus ad faucem insertis. — Corollae tubus 1½ lin. longus, limbus fere 3 lin. in diametro, saturate aurantiacus maculisque 5 saturatoribus pictus. — Species intermedia *A. lycopsioidem* inter et *A. spectabilem*; a priore dignoscitur insertione staminum, a posteriore corollis longe minoribus et praesertim corollae tubo non (ut in illa) ad faucem plicis intrusis semiclausa. — Hab. cum sequente specie [*A. spectabilis*] circa coloniam ruthenorum Ross in portu Bodega Novae Californiae. Annuæ." The seed-list in which this description occurs bears the printed censor's date, Dec. 25, 1835. This equals Jan. 5, 1836 of the present calendar.

Through the kindness of Prof. B. A. Keller, Director of the Institute and Botanic Garden at Leningrad, I have received authentic material of *Amsinckia intermedia*. This consists of an authentic fragment of the species, from the herbarium of Meyer, one of the co-authors of the species, and a fine specimen from the plantings in the St. Petersburg Garden in 1836. The specimens agree with the interpretation of *A. intermedia* given by Suksdorf, Werdenda 1: 88 (1931). The plant is a member of that variable and bewildering island species that Macbride, Contr. Gray Herb. 49: 12 (1917), and Jepson, Man. Fl. Pl. Calif. 844 (1925), have incorrectly called "*A. Douglasiana*." Greene, Bot. S.

Francisco Bay, 262 (1894), and Jepson, Fl. W. Mid. Calif. ed. 2, 350 (1911), earlier treated it, partly as *A. intermedia* and partly as *A. spectabilis*. The name, *A. intermedia* F. & M., is properly applied to the polymorphous species which is common in California in the interior valleys and on hillsides back from the immediate vicinity of the ocean.

Amsinckia spectabilis Fischer & Meyer, Ind. Sem. Hort. Petrop. 2: 2 and 26 (1836).

This species appears on page 2 of the above publication as a bare name in an alphabetic list of seeds. On page 26 (p. 1 of reprint) the following description is found: "A. SPECTABILIS. A. corolla fauce glabra plicis intrusis semiclausa, limbo longitudine tubi; staminibus ad faucem insertis. Species pulchritudine florum insignis atque distinctissima. Corolla aurea, limbo 6 lin. in diametro, ad faucem plicis 5, squamulas simulantibus, aucta. Annua."

In 1925 through the kindness of Prof. Boris Fedtchenko, with the assistance of Miss Olga Enden, I received two generous fragments of authentic specimens of this species. The specimens were grown in the St. Petersburg botanic garden in 1835-36. They are given as grown from seeds collected at Fort Ross, California, by Wiedemann. These fragments were examined by Suksdorf, Werdenda 1: 96 (1931). He correctly identified them with the coastal plant that Brand, in Fedde's Repert. 20: 319 (1924), has described as *A. nigricans*. Brand's plant, Heller 5614, is from the type-locality of *A. spectabilis*. I have seen many specimens of this plant in various herbaria from numerous garden-cultures. While evidently conspecific, these specimens rarely have the corollas as well developed as that found in the original culture at St. Petersburg in 1835. This is not surprising. I have grown *Amsinckia* in a botanic garden and under glass and have in most cases discovered remarkable differences in habit of growth and corolla-size between my cultures and the wild specimen from which the seed was obtained.

Macbride, Contr. Gray Herb. 49: 7 (1917), in his monograph of the genus, has treated the coastal plant (the true *A. spectabilis* F. & M.) under the name "*A. intermedia*." Jepson, Man. Fl. Pl. Calif. 844 (1925), attempted to follow him and has described the coastal plant as "*A. intermedia*." His illustration, however, is the inland species, which just happens to be the true *A. intermedia* F. & M. Previous to Macbride's paper in the writings of Gray, of Greene, and of Jepson, the coastal plant appears as "*A. lycopsoides*." Macbride, l. c. 5, of course, was quite incorrect in applying the name "*A. spectabilis*" to the smooth-fruited *A. grandiflora* Kleeb ex Gray. The name *A. spectabilis* F. & M. properly

belongs to the strictly coastal plant of California that has small dark nutlets, acute more or less denticulate leaves, and a pair of the calyxlobes frequently more or less united. Abrams, Fl. Los Angeles, 335 (1904), seems to have been the only author who has properly applied the names *A. spectabilis* and *A. intermedia*.

***Amsinckia lycopsoides* Lehmann, Del. Sem. Hort. Hamburg 1831: 1 and 7 (1831).**

On the first page of the Hamburg seed-list for 1831 appears the name "*Amsinckia lycopsoides* Lehm.¹" The exponent refers to a note on page 7 where the following is found, "Genus novum e familia Borraginearum, praeter alias notas cotyledonibus 4 distinctissimum. *Benthamia* Lindl. in litteris (non Richard Monog. des Orchidees iles de France et de Bourbon pg. 43, t. 7, fig. 2)." In the seed-list for 1833, p. 3, and 1834, p. 3, the binomial appears perfectly bare. In 1835, p. 3, it is listed in company with *A. angustifolia* Lehm. In 1836, p. 3, and 1837, p. 3, it is listed as one of four species, *A. angustifolia*, *A. intermedia*, *A. lycopsoides* and *A. spectabilis*.

In the writings of Fischer & Meyer the binomial, *A. lycopsioides* Lehm., appears as a bare name in company of *A. angustifolia* Lehm., in the first St. Petersburg list, Ind. Sem. Hort. Petrop. 1: 2 (1835). In the next list, 2: 2 (Jan. 1836), it appears with *A. angustifolia*, *A. intermedia* and *A. spectabilis* and on page 26 (p. 1 of reprint) has the following note concerning it: "AMSINCKIA LYCOPSIoidES. A. corolla fauce barbata, limbo tubo triplo brevior; staminibus corollae tubo paulo supra basin insertis. — *A. lycopsioides* Lehm. delect. sem. h. Hamburg. 1831. — Tubus corollae 3½ lin. longus; limbus 2 lin. in diametro, vix latior."

The species, *Amsinckia lycopsoides* Lehmann, is the type of the genus *Amsinckia*. The Hamburg seed-list in which it was first published is dated 1831. That it was actually published that year is proved by the review of this publication in the Litteratur-Bericht zur Linnaea (vol. 6) which bears the title-page date of 1831. The description of the species, *Amsinckia lycopsoides* Lehm., by Fischer & Meyer, appears in a seed-list for the year 1835 but this pamphlet bears a printed censor's date, Dec. 25, 1835 which is the equivalent of Jan. 5, 1836 in our present calendar.

It is to be noted that when, in 1831, Lehmann published his generic name, *Amsinckia*, that he definitely associates it with *Benthamia* of Lindley. This latter generic name was published by Lindley, in the same year, but only as a nomen nudum, Lindley, Nat. Syst. 241 (1831).

It was undoubtedly based upon material collected by Douglas along the Columbia River. This is clearly indicated by specimens in herbaria at Cambridge, Kew, London and Geneva. In the Lindley Herbarium at Cambridge there is only one sheet that has been determined as *Benthamia* by Lindley. This contains Cuming's no. 512 from Valparaiso and a specimen labeled "North West Amer. H. H. G. 1827, Douglas." Lindley has written in the corner of the sheet "*Benthamia lycopsoides* Mihi." There are various strong reasons for believing that this sheet in Lindley's herbarium formerly bore only the material from Douglas and that the Cuming material was later added to it, probably after Lindley's annotation. At Kew there are two significant specimens. One from the Bentham Herbarium is labeled "*Benthamia lycopsoides* Lindl. M. S. sem. ex Amer. occid. ex Douglas, Hort. Soc. Hort. London, 6-6-28." A similar sheet from the Hooker Herbarium is labeled "*Anchusa*, fl. yellow, *Benthamia* Lindl. mss. N. W. Am. Douglas, cult." Lindley published only the genus name, *Benthamia*. The binomial "*Benthamia lycopsoides*" seems to have been published first by DeCandolle, Prodr. 10: 118 (1846). This reference is clearly based upon a specimen at Geneva bearing the following data: "*Benthamia lycopsoides* Lindl. ined., Hort. Sociét. horticult. in Chiswick 6 jun. 1828." The name on the label is in the script of Lindley. The source is written by DeCandolle. The date given is the same as that found on the sheet in Bentham's herbarium and falls within the period when A. DeCandolle visited London for work on his *Campanulaceae*. The herbarium of the Horticultural Society was sold to the British Museum. There is a specimen from this source at South Kensington labeled: "sandy plains of the Columbia, 1825 (according to Lindley a new genus)." Lindley was in charge of identifying the plants grown in the gardens of the Horticultural Society at Chiswick. All the specimens mentioned are probably from seeds grown at Chiswick. They all represent the plant recently described as *A. simplex* Suksdorf, Werdenda 1: 33 and 53 (1927 and 1931).

There are a number of good reasons for believing that Lehmann's genus *Amsinckia* and his species *A. lycopsoides* are based upon Lindley's genus *Benthamia* and *B. lycopsoides*. In the first place shortly before 1830 Lehmann travelled in England and met various botanists there. He was a well known student of the *Boraginaceae*. Lehmann, in any case, was later in correspondence with Lindley, for he cites his authority for *Benthamia* as "Lindl. in litteris," and we may well believe that he received seed or specimens of Douglas's curious borage from Lindley and grew it in the Hamburg garden. Lehmann devotes about half of his short description of *Amsinckia* to citing Lindley's unpub-

lished *Benthamia* and its earlier published homonym. The specific name used by Lehmann is that selected by Lindley. What is most important, however, is that an *Amsinckia* conspecific with Douglas's plant was in cultivation in various European botanic gardens under the name "*Amsinckia lycopsoides*." There is a specimen at Kew collected by J. Gay in the Jardin des Plantes at Paris in June 1833, only a year and a half after Lehmann published *Amsinckia*. This plant was grown under Lehmann's binomial and represents the species collected on the Columbia by Douglas. In conclusion it may be noted that the short descriptive notes concerning *A. lycopsoides*, given in 1835 by Fischer & Meyer, apply to the plant collected by Douglas.

A study of Douglas's Journal, p. 116 (1914), fortunately reveals some information as to the original source of *Amsinckia lycopsoides*. The plant is evidently that mentioned under the date of May 2, 1825, in an enumeration of collections made on "Menzie's Island, in the Columbia river, opposite the Hudson Bay Company's establishment at Point Vancouver." According to Piper, Contr. U. S. Nat. Herb. 11: 620 (1906), Menzie's Island is that now known as "Haydens Island." The notes by Douglas are as follows: "(151) *Myosotis* sp., annual; hirsute, branching; leaves long, entire; linear-lanceolate; flowers bright yellow; tube long; mouth of the corolla spreading, with a dark spot opposite teeth; seeds not yet known; this very interesting species was found on Menzie's Island in company with Mr. Scouler, who agreed with me to call it *Myosotis Hookeri* [not *Myosotis Hookeri* Clarke (1883)] after Dr. Hooker of Glasgow; scarce, only three specimens of it were found, two of which are in my possession. — I have since found it in abundance near all the Indian lodges above the Rapids of the Columbia. S[eed]."
From these notes it is evident that seeds were not obtained on Menzie's Island and that, later, they were obtained somewhere above the Columbia Rapids. *Amsinckia simplex* Suksd. is known only from the general vicinity of Portland, Oregon (just south of Menzie's Island). It is scarcely separable from *A. arenaria* Suksd. which is reported from the Columbia Gorge and in eastern Washington. The name *Amsinckia lycopsoides* (Lindley) Lehmann is properly applicable to these concepts.

It has been shown that *Amsinckia lycopsoides* Lehm. is based eventually upon material collected by Douglas along the Columbia River. In subsequent paragraphs I have shown that *Lithospermum lycopsoides* Lehm. (1830) is based upon collections made by Scouler on the northwestern coast of Washington. In the writings of A. DeCandolle, Prodr. 10: 118, adnot. (1846), Gray, Synop. Fl. 2: 198 (1878), Macbride,

Contr. Gray Herb. 49: 7 (1917), Suksdorf, Werdenda 1: 101 (1931), etc., the binomial *Amsinckia lycopsoides* has been considered as merely a nomenclatorial transfer and as based upon *Lithospermum lycopsoides*. The similarity of the specific epithet is a mere coincidence. There are no reasons at all for supposing that these two species are identical. I have shown that *Amsinckia lycopsoides* is a plant from along the Columbia. *Lithospermum lycopsoides* is an earlier binomial, but since the specific name is preoccupied under *Amsinckia* it can not be legitimately transferred to that genus. A new name for the coastal plant of northwestern Washington is accordingly needed.

Lithospermum lycopsoides Lehmann, Pugil. 2: 28 (1830); Lehmann in Hooker, Fl. Bor. Am. 2: 89 (1838).

As was his custom in the Pugillus, Lehmann cited no specimens when he originally described *L. lycopsoides*. In the Flora Boreali-Americana, in which he contributed the *Boraginaceae*, however, he repeated his original description verbatim and cited the basic specimen. This latter is given as "Straits of de Fuca, N. W. America, Dr. Scouler." At Kew, from the herbarium of Hooker, there is a specimen that agrees perfectly with Lehmann's description and is labelled "*Lith. lycopsioides* Lehm. De Fuca, N. W. Am. Scouler." I agree with E. L. Greene, who has written on this sheet that "This, along with fragments in Herb. Benth. constitutes the type of *Lithospermum lycopsoides* Lehm. It has never been in cultivation." The plant is undoubtedly conspecific with that of northwestern Washington and adjacent Vancouver Island which has passed as "*Amsinckia lycopsoides*" in Piper's Flora of Washington, Contr. U. S. Nat. Herb. 11: 480 (1906), and in the monographs by Macbride, Contr. Gray Herb. 49: 7 (1917) and Suksdorf, Werdenda 1: 101 (1931). It is not the same species as *Amsinckia lycopsoides* Lehm., which is based upon specimens collected by Douglas near the Columbia. The present plant, a coastal species related to true *A. spectabilis* F. & M. of California, strangely has no synonyms. Since the specific name is preoccupied under *Amsinckia* a new name is needed. The plant may be called:

Amsinckia Scouleri, nom. nov. *Lithospermum lycopsoides* Lehmann, Pugil. 2: 28 (1830) not *A. lycopsoides* Lehmann (1831).

Amsinckia Douglasiana A. DeCandolle, Prodr. 10: 118 (1846).

I have examined the type of this species in the DeCandolleian Herbarium at Geneva. It is clearly a species with tessellate nutlets and large showy corollas. I consider it conspecific with *A. Lemmonii* Mac-

bride, Contr. Gray Herb. 48: 50 (1916). Suksdorf, Werdenda, 1: 102 (1931), who has examined authentic material of *A. Douglasiana*, preserved at the Gray Herbarium, has considered it closely related to *A. Lemmonii* but separable from it. He places these two species together in his monograph. Gray erroneously cited the name *A. Douglasiana* in the synonymy of the common inland species of California. Not having seen the type of *A. Douglasiana*, Macbride, Contr. Gray Herb. 49: 12 (1917), was misled by Gray's erroneous citation and applied it to the common inland species of California. The plant treated as *A. Douglasiana* by Macbride, and by Jepson, Man. Fl. Pl. Calif. 844 (1925), who followed him, is properly identified as true *A. intermedia* F. & M. *Amsinckia Douglasiana* A. DC. is a relatively rare plant of the South Coast Ranges of California and was probably originally collected by Douglas in San Luis Obispo or southern Monterey counties during his journey from Monterey to Santa Barbara and return.

***Amsinckia parviflora* Bernhardi**, Selec. Sem. Hort. Erfurt. 1833: 1 and 4 (Jan. 1834).

On the first page of the Erfurt seed-list for 1833 two *Amsinckias* appear in the alphabetic list of names, *Amsinckia lycopsoides* Lehm. and *A. parviflora* Bernh. A reference to the last, fourth but unnumbered page of the seed-list gives the following note concerning *A. parviflora* Bernh.: "(1) *Lithospermum calycinum* Moris, cui cotyledones 4, s. potius 2 bipartitae, speciem *Amsinckiae* sistit, quam *A. parvifloram* vocarem. An *A. angustifolia* Lehm. eodem planta?" The list bears a printed date, Jan. 18, 1834. No species of *Amsinckia* are mentioned in the Erfurt seed-lists for the year 1832. *Amsinckia parviflora* Bernh. appears to be no more than a mere renaming of *Lithospermum calycinum* Moris. The two names are, accordingly, exact synonyms and apply to Bertero's plant from Rancagua, Chile, described and figured by Moris, Mem. Accad. Torino 37: 98 tab. 22 (1834). In 1834 Lehmann cited Bernhardi's binomial as a synonym of *A. angustifolia* Lehm. I am inclined to believe this is correct, for as I shall discuss, I suspect that Lehmann's species is also based upon Chilean material.

***Amsinckia angustifolia* Lehmann**, Del. Sem. Hort. Hamburg 1832: 3 (1832), nomen; Fischer & Meyer, Ind. Sem. Hort. Petrop. 2: 26 (1836), description.

The above binomial appeared as a bare name in the seed-list of the Hamburg garden for 1832. It appeared again as a bare name in the list for 1833, p. 3, was omitted in that for 1834, and in the list for 1835, p. 3, was cited as follows: "*Amsinckia angustifolia* Lehm. (*A. parvifolia*

Bernh. Sel. sem. h. Erf. 1833).” This reference was repeated in 1836, p. 3. In the list for 1837, p. 3, it again appears as a bare name.

In the first list from the garden at St. Petersburg, 1: 2 (1835) the name *Amsinckia angustifolia* also appears bare. In the next list from St. Petersburg, 2: 2 and 26 (1836), the name appears in the list of seeds and on page 26 (p. 1 of reprint) the following description and references are published: “A. ANGUSTIFOLIA. A. corolla fauce glabra nuda, limbo tubo duplo brevior; staminibus ad faucem insertis. *A. angustifolia* Lehm. delect. sem. h. Hamburg. 1832. *A. parviflora* Bernh. select. sem. h. Erfurt. 1833. *Lithospermum calycinum* Moris. Enum. sem. h. r. bot. Taurinens. 1831 et in Mem. della Acad. d. Scienze di Torino Tom. XXXVII. p. 108. tab. XXII. — Corollae tubus vix 2 lin. longus, limbus vix 2 lin. in diametro. — A praecedente [*A. lycopsioides* Lehm.] floribus parvulis et praesertim staminum insertione diversissima.” All the references cited by Fischer & Meyer trace back to material, collected by Bertero in central Chile. What is more all the garden material, under the name *A. angustifolia*, seems best referred to the Chilean forms of the genus. All authors have applied *A. angustifolia* to the austral plant. There seems every reason for continuing to do so. I suspect that the cultures in European gardens were originally from seeds obtained by Bertero at Quillota or Rancagua, Chile, and subsequently distributed from Turin by Morris or Colla.

Omphalodes erecta, sp. nov., herba perennis erecta e caudice laxo ramoso oriens pilis mollibus gracillimis subcinerea; caulibus foliosis simplicibus vel supra medium sparsissime fertiliterque stricto-ramosis 3–6 dm. altis partibus maturis plus minusve glabrescentibus brunnescentibus 2–4 mm. crassis; foliis lanceolatis vel late lanceolatis 5–11 cm. longis 15–30 mm. latis (superioribus non-conspicue reductis) sub medio apicem versus in acuminem 1–3 mm. longam gracilem gradatim attenuatis, margine integerrimis basi angulatis vel subrotundis 3–6 mm. longe petiolatis, supra viridis sparse inconspicueque pubescentibus non rariter minute pustulatis, subtus pallidis saepe pilis abundantibus longioribus subcinereis; inflorescentia gracili laxo racemosa simplice vel basaliter furcata ebracteata 5–15 cm. longa 0–1 cm. longe pedunculata; pedicellis ad anthesin 3–6 mm. longis ascendentibus, fructiferis ad 2 cm. longis saepe decurvatis vel subcontortis; calyx ad anthesin pallide denseque strigoso, lobis 5 inaequalibus lanceolatis ca. 4 mm. longis; corolla coerulea vel medium versus violacea, tubo ca. 3 mm. longo, appendiculis faucium 5 trapeziformibus ca. 1.3 mm. longis et latis apice subemarginatis, margine pubescentibus, limbo ca. 13 mm. diametro patente ultra

medium lobato, lobis 4–5 mm. longis rotundis, sinibus loborum inconspicue plicatulis; antheris oblongis inclusis medium versus tubo corollae affixis; filamentis perbrevis; stylo ad anthesin 2 mm. longo, fructifero conspicuis 9 mm. longo; stigmato disciformi; fructu 4-ovulato; nuculo solitario (3 abortis) minute appresseque strigoso depresso lateque ovoideo, (cum alis) ca. 8 mm. diametro, margine evidenter 1–1.3 mm. late alato, ala plana patenti leviter denticulata, dorso nuculae convexo.

MEXICO: common in dense oak-wood along an arroyo near Santa Ana, between Alamar and Taray, Sierra Madre Oriental, ca. 25 km. s. w. of Galeana, Nuevo Leon, corolla blue with a light violet center, July 3, 1934, C. H. & M. T. Mueller 992 (TYPE, Gray Herb.); scattered in fields and waste places in canyon above Alamar, Sierra Madre Oriental, 1500–1800 m. alt., June 2, 1934, C. H. & M. T. Mueller 680 (G).

A remarkable species differing from all its congeners in its coarse erect habit of growth. The general habit and appearance of the plant, indeed, is more suggestive of *Cynoglossum* than of *Omphalodes*. From the American species of its genus it is further distinguished by its large solitary nutlets which possess a weakly denticulate and spreading wing, rather than a strongly toothed upcurved one. The foliage of *O. erecta* is very distinctive. All the American species of the genus have long-petioled more or less cordate leaves. The new species has them very short-petioled and lanceolate. Only one Mexican species, *O. aliena*, has a similar bractless inflorescence. The plant is a remarkable addition to the list of Mexican Boraginaceae.

HERBARIUM, ARNOLD ARBORETUM,
HARVARD UNIVERSITY.